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EDITORIAL.

WHILE COAL MINING in Pennsylvania has not yet required such deep shafts as those in England or Belgium, there are several which approach 1,800 ft. in vertical depth. They are the two Auchincloss shafts of the Delaware, Lackawanna & Western Railroad Company, 1,724 and 1,716 ft. deep, with one pair Corliss and one pair slide-valve first-motion engines; the Lytle shaft, at Minersville, 1,550 ft. deep, with four coal and two water compartments, equipped with two pair 36 by 60 in. first-motion piston-valve engines and one pair 30 by 48 in. Corliss; the Bear Valley No. 2 shaft, of the Summit Branch Mining Company, at Williamstown, 1,650 ft. deep, with four coal and two water compartments, equipped with two pair 36 by 48 in. and two pair 36 by 60 in. first-motion piston-valve engines, having conical drums. The South Wilkes-Barre shafts of the Lehigh & Wilkes-Barre Coal Company, the Pottsville deep shaft, and the Wadesville shaft are all over 1,200 ft. in depth.

THE DECLARATION of a dividend followed by the pledging of the mine to raise the balance required for that dividend, is an example of ineptitude which it would be difficult to surpass. It is no wonder that the directors of the Peak Hill Gold-fields retained a mining engineer to help them out of their dilemma, and it is gratifying to note that the confidence felt in Mr. Alexander Hill, who was thus engaged, and in his favorable report on the mine, enabled them to weather the storm of criticism from the shareholders. In future the management—at the mine in Western Australia and at headquarters in London—will be under the direction of Messrs. Hill and Stewart, and under these favorable conditions we expect more business-like proceedings.

WE PUBLISH ON another page an article by Prof. W. R. Crane, which, with the excellent drawings accompanying it, shows the types of construction adopted for head-frames and tipples over a large area of the Mississippi valley. This includes the coal and salt mines of Kansas, the coal mines of Iowa, Missouri and southern Illinois, and other mines in the same region. As examples of construction

which has been approved by experience in a large number of cases, the descriptions will be found of much interest.

OUR MELBOURNE correspondent sends us a particularly interesting letter, which will be found in its proper place. The development of the 'deep leads' or underground alluvial channels of Victoria is attracting much attention in Melbourne and in London. The extraction of the zinc in the Broken Hill ores is a matter of considerable moment to the spelter market; while the work at Mount Lyell is of particular interest in regard to pyrite smelting, a subject now in course of vigorous ventilation in this country.

EXPORTS OF iron ore from the United States in recent years have been confined, practically, to shipments of Lake Superior ore to a few Canadian furnaces. No ore has been sent to Europe, except a few small lots for experimental purposes. Recently, however, a beginning has been made by the export of a considerable quantity of ore to Glasgow and Antwerp; 12,000 tons having been sent in June, while it is understood that 18,000 tons more will follow, the present contracts covering a total of 30,000 tons. This ore is shipped by Witherbee, Sherman & Company, and is from the mines owned by that company, in the Lake Champlain district in New York. The ore is carried from Port Henry by lake and canal to New York harbor. The movement has been favored by low ocean rates, the charge from New York to Antwerp being about 5 shillings, or $1.20 per ton. It is understood that negotiations are pending for further sales abroad.

THE PRICE OF silver has again advanced, and it seems not improbable that it will go above 60 cents, unless there is an unexpected change in the situation. In some degree this is due to the careful handling of the market by the large sellers; and there is also a tendency to speculate for a rise, which has given a little help to the advance. In greater part, however, it is due to larger demand from the East, which is—as it has always been—the great buyer of the metal. India has been unusually prosperous; crops have been good and exports large. This has caused a demand for more currency, and has also resulted in larger purchases through the bazaars for personal use and hoarding. For the first half of the present year the increase in shipments to India and the Straits, as compared with last year, has been 63.3 per cent. Direct purchases for China have not been large, but it is believed that a good deal of silver has found its way into that country through Japanese and Russian channels.

A VALUABLE EXPRESSION of opinion on the introduction of the Chinese into South Africa is found in the last issue of the *Spectator*, itself the most influential critic of the British government's action in this matter. The letter referred to is written from Sumatra by one of those who "formed part of Mr. Creswell's white labor scheme"; this was an attempt made last year by Mr. Creswell, manager of the Village Main Reef mine, at Johannesburg, to prove that the better paid white workmen were more economical than cheap Kaffir labor. One clear instance is quoted. "A gang of white men, chiefly British, were engaged on the cyanide plant shoveling sands from large 400-ton tanks, and dumping the truck loads, under a foreman who got the last ounce of work out of his men. Under pressure from the directors, these men were replaced by an equal number of Kaffirs, who got through the same amount of work at exactly one-third the pay drawn by the white laborers."

As regards slavery, the writer in the *Spectator* refers to the thirty-eight white men who have signed two and three years' contracts with a mining company in central Sumatra and live in compounds, virtually tied down because they cannot get away without forfeiting their passage home, not to mention absence of transport to the coast. By their agreement with the company these men are relatively as much circumscribed in their actions as the indentured Chinaman now arriving on the Rand. Furthermore, all the arguments used against the contracting of Chinese coolies apply to the system under which Kaffirs are at present employed in South Africa. The fact is there has been a great deal of sloppy sentiment in the outcry against the introduction of the Chinese, just as there is a world of ignorance in the assumption that the coolie of eastern Asia is necessarily inferior, in morals and in citizenship, to the corresponding lower strata of all the so-called civilized nations. Japan has recently opened the eyes of those to whom the terms Aryan and Caucasian embody ideas of fundamental superiority, ideas comparable to the prejudice which used to exist between European races until the printing press and the railway swept aside the barriers of provincialism.

COPPER EXPORTS.

A feature of the copper market this year has been the increase in foreign buying here. The official returns up to the end of May show that our exports amounted to 99,680 tons; to which at least 16,000 tons must be added for the month of June, making a total for the half-year of 116,000 tons. This is an increase of more than 70 per cent over last year. Should these exports continue, the present year will pass all records in the copper exports from this country, which have gone mainly to Europe.

A point of importance, moreover, is that these large exports have gone, for the most part, directly into consumption. There is, so far as can be ascertained, no unusual accumulation of stocks anywhere abroad, in the hands of either dealers or manufacturers. Buying has been mainly to meet requirements. The price has not been at any time quite low enough to tempt purchases for speculation, or to hold for the future. European buyers have long memories; they have not forgotten the times of 11-cent copper, and quotations between 12 and 13 cents do not look cheap enough to them to induce the purchase of stocks for the future.

There is no doubt that the actual consumption of the metal abroad is, just now, very large. Business has been good in Europe—except in Russia—and money is being invested in new enterprises more freely than last year. This has led to the undertaking of much new electrical work of all kinds, in which the use of large quantities of copper is necessary. Moreover, there has been a considerable demand for the metal in the manufacture of war material; quite enough to account for part of the consumption.

The increase in buying has been more marked in Germany and France than in Great Britain. It has come in very well with the decreased demand here, and has been an important element in preventing a fall in prices, which would have been extremely trying to our copper producers.

STEEL SUPPORTS IN COAL MINING.

On another page we publish a short article, by Mr. R. V. Norris, summarizing present practice in the use of steel roof supports by mining companies in the Pennsylvania anthracite region; to this is added a valuable table for calculating the strength of such supports. The anthracite companies have tried rolled steel shapes to replace heavy timbering at the bottoms of shafts and slopes, in underground pump rooms, in wide turn-outs and in drifts. As an illustration of heavy work Mr. Norris informs us that for the shaft-foot at No. 4 colliery of the Susquehanna Coal Company he has used 24-in. I-beams with 24 to 32 ft. span.

By reason of wasteful methods of lumbering, and the lack of tree culture on a large scale, our forest resources have been so ruthlessly pillaged that the mine-owners must expect to pay high prices for timber; and within the life of existing mines they will have to pay prices which are now deemed prohibitive. Hence it is not strange that in Pennsylvania coal mines the engineers and superintendents are already beginning to follow European practice by using masonry, concrete or steel to replace timber in permanent work. There can be no doubt that this practice will be adopted to an increasing extent.

Masonry or concrete alone, steel alone, or steel reinforced by concrete, are all used in

Pennsylvania mines for drifts in bad ground, shaft bottoms, etc., and the relative advantage of these materials is a most interesting topic which we intend to discuss hereafter; for the present we may point out that European engineers make wide use of steel in underground work. The props are not only such H-beams as Mr. Norris describes, but also beams with detachable feet, stamped from steel plates; adjustable telescoping props made of steel tubing with steel plate ends are also being tried in England. Steel bars and wood props are widely used in England, particularly for heavy ground, and, when carefully set, have proved efficient. Where cutting machines are used in long-wall work, bars running transversely and longitudinally are employed near the faces—when the roof is bad—thus obviating close timbering and allowing the machines to work in places otherwise impossible. In continental Europe complete sets of steel are largely used, the common type being two pieces of circular shape joined by a sliding iron collar. At some French collieries steel lagging is used. One of the great advantages of steel compared with timber, aside from durability, is the smaller space occupied, entailing less excavation. Space forbids further discussion, but the subject is of so much importance that we hope Mr. Norris' suggestive paper will elicit comment from our friends on the other side of the Atlantic.

STRIKE TALK IN THE ANTHRACITE REGIONS.

The officials of the United Mine Workers in the anthracite fields of Pennsylvania are evidently having trouble in getting members to pay dues and keep in good standing. The official organ of the association, in predicting a big strike in 1906, says that the operators are storing coal and otherwise preparing for a struggle, and that the findings of the Strike Commission have been strained and twisted by the decisions of Carroll D. Wright, the umpire, so that the good intentions of the Commission have been destroyed.

These statements scarcely call for serious comment. Coal is being stored—but it is steam fuel, the market for which is restricted by industrial dullness and the low price of bituminous coal. As for Mr. Wright's partiality, no operator, we think, will admit—even privately—that Mr. Wright's decisions ever favored *him*. Recently the papers published in the anthracite regions have stated that there was much dissatisfaction among the miners, not only with the rulings of Mr. Wright, but even with the work of the Conciliation Board, on which miners and operators have equal representation. Recent grievances of the miners have been the failure of the Lehigh Coal & Navigation Company to give back old places to men who had left the company's employ by refusing to work at certain mines, while the mines at which they had been employed were idle; the refusal of the superintendent of Coxe Brothers to reply to certain complaints; also the action of the Scranton Coal Company in refusing to deduct from the wages of certain miners the proportional amount to pay check-weighmen and docking-bosses. Of these grievances the last will probably be adjusted by Mr. Wright's letter upholding the men's contention and saying the company can discharge men who object to paying their share when a majority of the employees at any colliery have asked for check-weighmen. The other two grievances probably show merely the activity of the distinct president, Mr. Dettrey, formerly an employee of Coxe Brothers, and have small cause for being.

Really the miners in the anthracite regions have small reason for complaint. They are working more days in a week than the men in nearly all the bituminous fields of the country, and their wages, fixed till 1906, were not cut last spring. It is altogether likely, therefore, that the talk of possible strikes from union officials simply means that these officials, finding interest in the union declining, are willing to have the men violate the spirit and even the letter of the Arbitration Commission's finding, in the hope of showing the power of the union; or else the officials merely wish to keep up interest in the union by giving local newspapers something to talk about.

ANOTHER ASPECT OF MINING FINANCE.

A good deal of public attention and interest have been aroused recently in a certain phase of mining finance, and about certain revelations promised with regard to it. We have so far paid little attention to it in our columns, for the reason that it seemed to us rather a matter of the stock exchanges and of speculation. The people who bought the stock in question and those who speculated in it—and lost—did so, not because it was a mining stock, but because it was backed by certain individuals. They invested in it, or "took a flier" in it, without any reference to the property it represented; they would just as soon have taken Leather Preferred or Hackensack Meadows, if they had been brought out by the same financiers. As it does, however, relate to a financial episode which affects the mining world in a way, some reference to it may be appropriate.

It is unnecessary to go into all the details. All of our readers know something of the Amalgamated Copper Company—its formation, with the implied intention to control the copper production of this country, and the copper trade of the world; its control of a number of important copper mines; and its failure to secure the dominating position in the market. Many of them are also familiar—some of them, we fear, to their sorrow—with the manipulation of its stock. Some of them also know Thomas W. Lawson as a speculator who is supposed to have made much money; a man who is always willing to talk; and a prophet whose predictions have not always come true. Mr. Lawson had some share in the formation of the Amalgamated Company, and was generally credited with unloading upon it a property of small value at a high price, as part of his share in the transaction. Since then, Mr. Lawson has quarreled with the Amalgamated leaders over quite another matter—some transactions in gas stocks. He now says that his eyes have been opened, that he sees his errors in copper, and that, as a sign of repentance, he is going to give the public a full history of Amalgamated and all its ways. This he has begun to do in a magazine of this city. The first article, already published, is chiefly taken up by rather vague intimations of what he is going to say in the following papers. Specific criticism must, therefore, be withheld until more articles have been published.

As we have already said, we have not heretofore gone into the Stock Exchange side of the matter in our columns. We have, from time to time, taken occasion to criticize severely the action of the Amalgamated Copper Company in the metal market, and its policy of secrecy and concealment of its operations. We have, on the other hand, spoken with approbation of the technical management of some of its important mines. In both cases, our intention was to be entirely fair, and to blame or praise as seemed to be just, without allowing disapproval of one course to affect judgment on another.

The present matter, it seems to us, is entirely outside of trade policy or technical management. The public now regards Amalgamated stock with a degree of suspicion, for which there seems to be some justification. If Mr. Lawson is able to tell the whole truth about it, we may have some facts upon which to base proper comment, and the public may acquire valuable information. But the public has not yet learned to accept Mr. Lawson as infallible; and such statements as he may bring forward will have to be supported by substantial proof—just as intelligent men would require the same kind of proof from Mr. Rogers or Mr. Rockefeller, should they make reply to their former ally and present adversary. In other words, the public does not regard either party as free from suspicion in this case, or as infallible.

There is a saying that when insiders fall out, outsiders get their dues. Like many other sayings, it does not often come true. It may do so in the present case. We doubt, however, whether the result will be anything more than a brief sensation, and perhaps a lot of personal vituperation, more entertaining than instructive.

MARKET CONDITIONS.

July 13.

The midsummer holidays are well on, and the metal markets are dull. Copper shows an improvement in prices and business. The same may be said of tin. Spelter is steady; there has been a general restriction of ore production in the Joplin district.

In lead, the important news is the probable consolidation of the National Lead Company with the United Lead Company, which is referred to in our market columns.

Silver is steady, under continued buying from the East.

The iron and steel markets are very quiet. The Billet, Plate, Sheet and Rail pools, at their meetings last week, decided to make no changes in prices. The decision is to restrict production, rather than to make concessions in order to cultivate business.

The western coal markets show no change. Local trade is quiet everywhere, and the Lake business is slow.

On the seaboard the conditions are unchanged, both in the bituminous and the anthracite coal markets.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

Aluminum annealed is one of the softest and most pliable metals; by cold working it is given the stiffness and temper of hard brass.

A radio-active precipitate has been obtained from rain-water by adding a little barium chloride, and precipitating the barium with sulphuric acid. The filtrate, when boiled down, was quite inactive, showing that the radio-active matter had been completely removed by precipitation.

The Premier diamond mine, near Pretoria, Transvaal, yielded 75,891 carats from 111,210 loads of 'blue' during the month of May. This output is valued at $525,000; of which about $400,000 is estimated profit. These figures make even the leading gold mines of the Rand seem small.

The commercial production of calcium carbide began in the United States at Spray, N. C., in 1894. Its use in generating acetylene gas has grown rapidly, and in 1903 the consumption in this country was about 16,000 tons. At Niagara Falls, N. Y., where power is cheap, the daily production last year was 50 to 60 tons carbide at a reported cost of $24 per ton.

Experiments conducted by Elster and Geitel in Germany, and by Allen and Rutherford in Canada, indicate that the property now known to us as radio-activity exists in the atmosphere. This has been proved by careful and delicate electric tests. This radio-activity is much greater in a body of air which has not been disturbed for some time—as in a cave, a cellar or a closed room—than in the open air, which is constantly in motion.

THE BUTTE COPPER COMPANIES.

The only reports made by the great copper mining companies, in the Butte district in Montana, are those submitted yearly to the board of assessors of Silver Bow county. These statements are submitted in order to determine the taxes to be levied on the properties, and give only such information as is required by the law. They do not furnish any figures upon which an intelligent analysis of operations can be made. Such as they are, however, they constitute the only published statements of these companies, and we give the figures as filed. They cover the year ending June 1, 1904.

In the table below we give the earnings and expenses of the companies constituting the Amalgamated group of mines:

	Tons.	Earnings.	Expenses.	Net earnings.
Anaconda	983,001	$10,761,473	$9,501,597	$1,259,876
Per ton	.....	10.95	9.67	1.28
Boston & Mon.	988,866	12,720,282	8,145,784	4,574,498
Per ton	.....	12.86	8.24	4.62
Butte & Boston	202,286	1,576,622	1,479,769	96,853
Per ton	.....	7.79	7.31	0.48
Parrot	165,408	1,270,627	1,036,662	233,965
Per ton	.....	7.68	6.28	1.40

The expenses included in the table above are given in the statements in detail, the figures being given below:

	Extraction.	Transportation.	Reduction.	Marketing.	Total.
Anaconda	$3,665,997	$147,450	$3,758,797	$1,929,353	$9,501,597
Per ton	3.73	0.15	3.82	1.97	7.70
Boston & Montana	2,860,637	988,866	2,500,743	1,795,538	8,145,784
Per ton	2.89	1.00	2.53	1.82	8.24
Butte & Boston	692,343	35,048	540,384	211,994	1,479,769
Per ton	3.42	0.17	2.67	1.05	7.31
Parrot	476,581	29,773	530,308	.....	1,036,662
Per ton	2.88	0.18	3.22	.....	6.28

The companies also report separately their expenditures for necessary labor and machinery. These expenses are not additional to those given in the foregoing table, but are included in the items there given. The figures are as follows:

	Labor.	Machinery.	Total.
Anaconda	$4,322,657	$3,102,137	$7,424,794
Boston & Montana	2,921,952	2,439,428	5,361,380
Butte & Boston	682,655	550,072	1,232,727
Parrot	676,629	330,260	1,006,889

There seems to be much variation in these statements. Thus labor and machinery charges were 78.1 per cent of the total expenses of the Anaconda, but only 65.8 per cent of those of the Boston and Montana.

The statements of the other companies, outside of the Amalgamated group, give a little less detail, but are of the same character. We give them, in tabular form, below:

	Tons.	Gross product.	Extraction.	Transportation.	Reduction.	Total expenses.	Net earnings.
Colorado Smelt'g & Mg. Co.	206,035	$1,016,597	$526,276	$31,015	$384,374	$941,665	$74,832
Per ton	.....	4.93	2.55	0.15	1.87	4.57	0.36
W. A. Clark	278,776	2,428,126	1,179,679	61,603	942,050	2,183,332	244,794
Per ton	.....	8.70	4.23	0.22	3.37	7.82	0.88
Montana Ore Purchasing	224,080	1,694,045	649,832	50,418	564,682	1,264,932	429,113
Per ton	.....		2.90	0.22	2.52	5.64	1.86
Johnstown	15,865	273,830	72,662	.....	111,055	283,717	90,113
Per ton	.....	17.26	4.58	.....	7.00	11.58	5.68
Speculator	90,352	762,528	528,790	.....	.....	528,790	233,738
Per ton	.....	8.43	5.85	.....	.....	5.85	2.58
Hypocka (Minnie Healey)	119,817	750,054	475,673	26,360	265,994	768,027	*17,973
Per ton	.....	6.26	3.97	0.22	2.22	6.41	*0.15

*Loss.

W. A. Clark's mines report an expenditure of $720,718, included in the items above, for labor. The Johnstown and Speculator report no change for transportation, their ore being sold at the mines.

The reports include no statement of the metal produced, and the figures given are therefore of little real value.

Carbon bisulphide, first made by electricity at Torrey, N. Y., in 1900, is now used extensively as a solvent and extractive agent by chemists, also as a germicide and insecticide, and for making prisms, rubber cement, etc.

IRON MINING IN NEW JERSEY.

The Basic mine, near Buttzville, in Warren county, is operated by the Basic Iron Ore Company, of which R. L. Ahles is president and Erskine Hewitt, secretary; the office being at Buttzville. The mine is now being developed by three shafts. No. 1 is now 135 ft. deep, and levels have been driven 460 ft. west on the vein, and 300 ft, east, to No. 2 shaft. No. 3 is still further east than No. 2; it is now down 100 ft., and is to be put down 150 ft. further before drifts are started.

The report of the State Geologist says that the plan for working this mine is a radical departure from methods heretofore used in New Jersey. The caving system, as used in some mines on the Mesabi range in Minnesota, has been adopted. The three shafts are to go down well to the bottom of the ore deposit. Levels are then driven into the ore, and timbered raises sent to the top of the deposit. The ore is then blocked out in 28-ft. parallelopipeds. Starting from the top a block is caved down to the main level and taken up the main shaft, and so on, always working from the top down. The overburden of glacial drift is then allowed to fall in, being kept from the ore by planking. This method saves an immense amount of timber, and allows all the ore to be removed. In this mine, with its heavy overburden of glacial debris and soft ore, this method can probably be worked to advantage.

The Ahles ore is markedly different in appearance from the greater poportion of the iron ore mined in New Jersey, which is compact magnetite with more or less pyrite through it. The ore from the Washington mine, which is near the Ahles mine, carries about 5 per cent sulphur, which is removed by roasting. The Ahles ore contains practically no sulphur, and further differs from the Washington ore in a high water content, over 10 per cent, and is loosely pulverulent. It is in reality a mixture of magnetite and limonite.

The following analyses furnished by the producers, illustrate the possible alterations and hydration.

	Washington.	Ahles.
Silica	10.18	10.72
Iron	59.54	46.00
Sulphur	4.00	nil
Manganese	0.07	4.00
Phosphorus	0.43	nil
Titanium	0.10	nil
Combined water	nil	10 to 12.00

During the past year the only ore taken from these mines has been that removed in the process of development. This has amounted to some 30,000 tons, of which 20,606 tons were used in Pequest furnace, mixed with ore from Ringwood, N. J. A high-grade pig was produced.

DISCUSSION

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the columns of the ENGINEERING AND MINING JOURNAL.

HEAD FRAMES.

The Editor:

Sir.—In your issue of March 24, under 'A Simple Head Frame,' you give an illustration, showing the construction; and from the short description accompanying, it is inferred that the chief merit lies in its economy of timber.

On an examination of the structure it would appear (if this construction is entirely relying on the timber employed) that its stability is open to question. It would rather seem to be composite in structure, relying not on timber alone, but also on wire-rope. If this is correct, the case would not appear to be fairly stated; for, if the services of the back-leg, which resists the overturning moment by the compression of its members, be displaced by wire-rope, which in tension fulfils a like office, it would not appear (following out the same line of argument, viz., that of timber conservation or rather substitution) why the front legs should not also be constructed of steel pipe, or some other efficient steel structure, and then we should have still further economy in the timber employed.

It is inadvisable to be too critical; but it would seem in this instance that credit has not been given to the wire-rope members, without which the structure would be unable to resist the forces tending to overturn it. There is another feature that should not be lost sight of in this instance, and that is relating to the necessarily slow speed of winding employed; and it does not necessarily follow that designs, suitable for very slow speeds, would meet the requirements when even only average winding speeds are employed.

Referring now to head-frames in general, I have always taken great interest in their design and construction, and in common with most engineers have seen them under diverse conditions.

I remember very well years ago in Western Australia, where up to that period the 'poppet-legs,' or, as I preferred to name them, 'straddle-legs' were in universal use, I designed and erected a head-frame after the gallows type. It was built of salmon gum, in pieces not over 12 ft. long, and in consequence needed considerable strutting and bracing, so that a neighboring manager named it the 'bird-cage,' and expressed his fears of even walking underneath. I have little doubt that the frame contained unnecessary members, but, when winding to a considerable height above surface, and with fair speed, vibrations of the structure must be guarded against.

The Australian 'poppet-legs' always did appear to me to be the most inefficient mechanical devices imaginable, and I have seen several that could rely on nothing but their weight to keep them from overturning, and others that had a 'back-leg' placed subsequently in an awkward fashion to keep them from coming to grief.

As to frames of wood, I am decidedly wedded to the 'gallows-frame' type, for with long and heavy timbers it is possible to dispense with all but the least possible number of struts or braces. I say 'heavy,' for in winding from depth, with heavy loads and fast speeds, it is essential to have the timbers of sufficient section to remain rigid, and not set up vibrations; although no one could contend that such dimensions are requisite to withstand the strains due to the actual weight lifted.

The modern tendency is, of course, to replace timber altogether with steel structures, of which many excellent types come to my memory; notably, such structures as are seen at the Red Jacket shaft, Michigan; the Robinson Deep, South Africa; or some of the coal pits in South Wales; but, in designs of steel head-frames, the palm must be given to such designs as are seen at certain of the German collieries, where the frame consists essentially of one main member, and that a built-up latticed girder placed directly in the line through which the resultant of forces falls.

Such a frame appears at first decidedly peculiar; but, on examination, it cannot be criticised adversely from the view-point of its scientifically mechanical design.

H. E. WEST.

Matagalpa, Nicaragua, June 14, 1904.

(In our issue of March 7, 1903, there appeared a detailed article on head-frames by Mr. A. Forsyth and on other pages of the present issue there will be found an excellent article on 'Head-Frames and Tipples,' by Professor W. R. Crane.—EDITOR.)

THE ECONOMIC RATIO OF TREATMENT CAPACITY TO ORE RESERVES.

The Editor:

Sir.—Under the above heading appears an article by Mr. H. C. Hoover in your issue of March 24. As this subject forms one of the most important of the financial problems with which the engineer has to deal, it would be advantageous to have it fully discussed and ventilated by men in different parts of the world, and I put that view forward as my excuse for the remarks that follow.

The general impression made upon my mind after carefully reading through Mr. Hoover's article is that while keeping the main issues well in view, he is somewhat obscure as to the basis of his reasoning, and as to the many contingencies for which provision must be made before the well-known maxims which he expounds can be practically employed. It may therefore be well to further discuss some of the questions he has raised, with a view to greater elucidation and further suggestion.

Mr. Hoover states as a preliminary: "Starting with an assumption of unbroken continuity to their utmost boundaries, our South African friends need but little outside of compound interest tables upon which to found their finance. In the great majority of mines, however, the result of development at their lowest levels remains speculative and gives a zest such as an assumed persistence can never afford." It seems to me that Mr. Hoover has imbibed the popular idea that the art of mining on the Rand is conducted upon such simple lines owing to natural conditions, that, as he says, "our South African friends need but little outside of compound interest tables upon which to found their finance." It should be understood by engineers, at least, and I affirm it now, that the mines of the Rand are subject to as extreme fluctuations in value as deposits of any other kind, and that it is equally necessary on these fields to develop skilfully and far in advance of the mill as upon any other gold-field, if any knowledge of the conditions governing the problems discussed by Mr. Hoover is to be acquired.

The essential difference between the Rand banket beds and metalliferous deposits of differing origin is, that in the former we are not called upon to contemplate the complete disappearance of our values within the limits so far worked—a contingency which always has to be reckoned with in other forms of deposit. It is just as necessary, however, that reserves should be well ahead of mill requirements for the consideration of the question of the ratio of treatment to ore reserves, otherwise for one period the mines would be earning large profits, and for another they would be working at a loss. On the Rand, equally with other fields, we must consider the possible rate of development, which is governed by the facilities for attack; the ore exposed per foot driven, and the percentage of payable ore to the total developed.

In some sections of the Rand, the reef averages less than 6 in. wide, and if in such cases the proportion of payable ore is as low as 30 per cent, and if the development scheme is rendered bad, as is the case in some instances, by faults or dikes, then it is clear that the plain sailing which Mr. Hoover believes is an essential condition of mining work here, is entirely an erroneous conviction.

In the second paragraph of his article Mr. Hoover states "that the most economical and profitable treatment capacity is the maximum capacity which can be employed, is not difficult to demonstrate; that the maximum must depend, however, upon the speed of development, and that the speed of development must be pushed as fast as the limitations of nature will permit, is but to state a corollary. Yet, curious as it seems, the number of mines, which have been operated upon the principle that the mill is the fixed quantity and the mine the variable, exceeds the number conducted upon the reverse plan." This sentence aptly illustrates my view as to the obscurity of Mr. Hoover's basis of reasoning. The statements are entirely true, but there is a variety of principles involved which cannot be thus settled by a stroke of the pen. Firstly, we must consider the financial status of the company operating, as to whether it is in a position to make the monetary arrangements necessarily involved in a scheme for expansion. Let us take a case as an example. Assume a company owning a property which requires £500,000 to bring it to the producing stage on a basis of 100 stamps. To find such a sum of money might not only exhaust all the cash resources of the company, but cause it to overdraw to the extreme limit of its credit. Let it be assumed that the company has commenced milling and is earning profits. It is now suggested that it should accept Mr. Hoover's dictum "that development must be pushed as fast as the limitations of nature will permit." To carry out the suggestion one of the following alternatives might be adopted: either a loan to cover excess development, or the profits are utilized for the purpose of extra development. As the company is assumed to have no further credit, it cannot adopt the first alternative, and for the same reason in this instance it would not be likely to adopt the second. The further view that current profits should be utilized for the benefit of the later shareholders, would also be contested by the present shareholders, who naturally would want a cash distribution as soon as such was available.

In this instance, therefore, although Mr Hoover's dictum is in every sense correct, it would be impossible to accept his policy. The basis of reasoning must therefore include:

1. Financial credit.

2. An agreed basis of arrangement as to the manner in which the capital will be raised, namely:

(a) Whether as a direct loan.
(b) By the issue of reserve shares.
(c) By the utilization of current profits.
(d) By increasing the company's capital.

As he leaves the reader to guess these alternatives it has seemed to me pertinent to mention them.

Mr. Hoover well remarks, in the concluding sentence of the quotation I have made, that the mill is in general regarded as the fixed quantity and the mine as the variable. In my 'Deep Level Mines of the Rand,' it was shown that if a company running a 200-stamp mill on a mine with a 20-years' life earned an annual profit of £336,000, the present value of the total profit of £6,720,000, allowing 6 per cent for dividends, and 3 per cent for amortization of capital, would be £3,456,768. If, however, the total amount of £6,720,000 is discounted as a yearly dividend of £672,000 for ten years on the same basis as before, the present value of the amount becomes £4,564,224, or £1,107,456 greater than the same amount earned in a 20-year period. In other words, if the milling equipment is increased at intervals, and the mine worked out in ten years instead of twenty years, the net gain, even after allowing for extra expenditure for increased equipment, in the instance taken, is materially increased.

It is difficult to get the financial controllers of mines always to follow the engineer in this respect. They object that there is a constant shifting of the financial basis, while there is new equipment to be erected, and excess development to be accomplished, and, strangely, they have a sentimental liking for a longer life, which has the one element of possible participation in improved working conditions to recommend it. If the engineer can see beforehand that the property to be worked is one likely to lend itself to a scheme of this kind, he can suggest to the financial heads, the provision of reserve shares which can be issued from time to time to meet the capital requirements, and thus the current earnings of the mine are not diverted.

Mr. Hoover says: "We now divide the various charges against working expenses into: First, those charges variable with tonnage, such as development, haulage, treatment, etc, and second, those charges, usually referred to as 'fixed,' which depend partially upon the element of time as well as tonnage, and include, partially or wholly, pumping, management, amortization of capital invested, etc." Although not entirely relevant to the subject under immediate discussion, some remarks upon this and kindred heads may not be out of place. The development charge on a mine is one susceptible of very diverse treatment. There are, however, two methods which are legitimate, and properly suit special conditions. The variation in the conditions arises out of a question of policy, which again may be dictated by the financial resources at command. One engineer may recommend that the mine be developed for a mill of fixed capacity and to such an extent before milling begins, that there will be no subsequent necessity to develop at a more rapid rate than the mill requirements, that is to say, the total ore reserves are practically unchanged. In such a case the cost of development is rightly charged to working account as a lump sum. For the same property as above assumed, another engineer may recommend development of the mine on a comparatively low basis, and two years ahead of the mill. He may question the soundness of a policy of sinking large capital sums in development work many years ahead of requirement, because the interest on the sum should rightly—although in practice it is not—be charged against the developed ore.

After the mill starts, the policy laid down provides for rapid excess development and periodical increases to the equipment, for which policy the necessary financial provision has been made. As the rate of development might easily absorb the total working profits, the latter are not diverted, but the development work is paid for out of capital each month. At the end of the year the accounts are made up and it is found that, say, 200,000 tons of ore have been developed, costing £50,000. The working charge per ton milled would, therefore, be debited with an amount of 5 shillings per ton—the cost to develop—in order to gradually redeem the development at cost.

The question of amortization of capital in a mining undertaking is a very difficult one, and I cannot follow Mr. Hoover in his view that it should be made a fixed charge against working costs. Amortization can only be fixed on a definite knowledge of the profitable term of an undertaking. If a mine be figured to have a life of ten years, and it ultimately proves to have twenty, or vice versa, the charge for amortization will in the first instance have been too heavy, and in the latter too light. The best principle is that the company should not, as a company, attempt to amortize. The value of its shares on a given earning, on the basis of amortization of capital or otherwise can be readily computed by the investor. If the company puts aside an annual amount as amortization, it naturally reduces the distributable profits, and these might possibly, if distributed in full to the shareholder, be reinvested by him with immediate benefit. Moreover, if investors who bought interests in the earlier stages of the mine sold out at a later date, the profits which they should have received would accumulate to the advantage of the investor who bought during the later stages of the company's career, and thus the former would be at a disadvantage, unless the market appreciation of the company's policy of amortization were fully reflected in the share value throughout. It should be the business of the shareholder in his individual capacity to amortize his investment, but not that of the company in its corporate capacity.

Mr. Hoover says: "In these cases less than three years' accumulation of the increment of profits is required to amortize the entire capital involved." He does not explain how he will deal with the amortization. If it is written off profits, the future shareholder benefits to the prejudice of the present, and there is a reduction of dividend for that period which may affect the price of the stock. If the secondary equipment be paid for out of capital the earnings on the greater capital sum entailed must be considered.

I cannot follow Mr. Hoover in his treatment of amortization of outlay on plant. I take it that good plant on any mine has a life of not less than seven years, and with proper care and sound maintenance much longer. Let it be taken, however, at seven years. Now, if the cost of plant, as suggested by Mr. Hoover, is written off in three years, there would appear to be a loss on the transaction, unless the added profits will amply compensate for the potential loss in plant. The figures as he gives them show only about a similar net result, in the cases of the primary and secondary equipments, after deducting the capital outlay on the latter. The sole advantage would then be the difference in the present value of the ultimate profit earned, and if we take it that this is £100,000, the advantage of earning it in three years instead of six represents, on a basis of 6 per cent for dividends and 3 per cent for amortization, £9,210. Mr. Hoover takes it that on the primary basis a three years' reserve should be figured upon. If the development increased so rapidly that a six years' reserve is built up, although he does not suggest how he arranges his finances in the meantime—then, if I read him aright, he would add secondary equipment to such an extent as to make the reserve again three years. But supposing that no more payable ore were discovered, then it seems on his own showing that, saving the aspect of the increased present value of the profits, there is no special advantage in the scheme.

Suppose, for instance, we have a 100-stamp mill which crushes 168,000 tons per annum. A reserve of six years for such a mill would be 1,008,000 tons. Now, if we build another 100 stamps and utilize the increment of profit to amortize the outlay we get a result somewhat as follows:

Cost of 100 stamps, "secondary equipment," and all accessories, including power, etc.	£100,000
Additional water supply, pumps, etc.	10,000
Additional buildings, quarters, etc.	10,000
Total	£120,000

Assume profit on the 100-stamp basis to be 10 shillings per ton.

Assume profit on the 200-stamp basis to be 12½ shillings per ton, the increment of profit due to adding 100 stamps is:

Total profit earned on 100-stamp basis in six years 1,008,000 tons at 10s. per ton	£504,000
Total profit earned on 200-stamp basis, in 3 years, 1,008,000 tons at 12½s.	630,000
Total increment of profit	£126,000
Total cost of secondary equipment	120,000
Balance, profit	£6,000

If interest be added to the capital outlay incurred for the secondary equipment, the balance shown will disappear.

In mines of uncertain continuity in depth it would therefore appear necessary to make a more conservative ratio of equipment to ore reserve than that mentioned by Mr. Hoover. If, as I have suggested, the payable ore were suddenly to give out when sufficient reserves to provide an increment of profit that would just amortize the capital outlay in additional plant had been secured, then the mine would possibly be prejudiced in the following way. All mines are found in practice to contain the ore in shoots, streaks, pockets or patches. As the workings progress it becomes clear that a process of selection has been in practice, by which ore falling below a certain standard in grade is allowed to remain in the mine. The longer the mine is worked the greater becomes the aggregate tonnage of more or less developed ore of a grade falling below the arbitrary limit of payability. It is a truism, however,

that in every mining field the costs of production vary directly with the age of the field; in other words, there is a practically continuous reduction in costs year by year. In the instance I have previously assumed of a mine having a final reserve of six years' payable ore on a "primary" basis, it is probable that large quantities of ore left in the mine which are unpayable during the first of the final six years would, through decreasing costs of production, improved methods, whether mining or metallurgical, fall within the limits of profitable working before the first year's work, and therefore the mine would, under these conditions, secure a new lease of life, on ore of a grade which, if worked out in a three years' period would still be unpayable, despite the lower operating costs of an increased installation. There should, therefore, be a big margin of increment of profit allowed over and above the amortization of plant amount, and even then I doubt if the scheme is a satisfactory one notwithstanding that the objects aimed at undoubtedly are.

It appears to me obvious that in mines of uncertain continuity in depth there can be a definite and satisfactory basis of ratio of equipment to ore reserves established, but on a different plan to that proposed by Mr. Hoover. The conditions of such mines call for very advanced development, not only to enable their future possibilities to be gauged, but to put the operators in a position to average up, over the widest possible area, the grade of the ore developed, in order that steady outputs may be maintained. Further, by such a scheme it is possible to include a large tonnage of ore near —but just below—the arbitrary limit of payability, which would inevitably be untouched if the mines were worked on narrow margins of development.

After all, the whole matter under discussion rests upon the courage and resources of those who control the finances of the company. Every engineer has experienced a difficulty at some time or other in persuading the financial heads of a mining business to carry development even one year ahead of the mill, owing generally to shortness of funds. If they can be persuaded to follow the advice of the engineer I believe the right policy to be the following, which I submit with all deference:

It is assumed that preliminary prospecting has been finished and a scheme for permanent work is to be provided.

First Step.—The mine to be opened out for examination, to such an extent that data for a sound development policy can be formulated.

Second Step.—A development policy framed, including estimates of cost; time to carry it out; and probable tonnage and value of ore that will be opened up.

Third Step.—From the information to be gained as the development proceeds, a justifiable limit for ore reserves to be fixed, taking into account all the variables of width of reef, percentage of payable ore per hundred feet driven, and facilities for attack.

Fourth Step.—A mill of a capacity fixed by the limit of ore reserves to be erected which reserves should not be less than the total which the mill would crush if worked continuously for two years.

Fifth Step.—Development to be continued, at least at the milling rate, on payable ore.

For the time being these are all the steps which in a sound policy can be formulated. The mine now works steadily ahead for a couple of years, more or less, as the circumstances decide, proves its ability to make a profit on this basis, and the question of further additions are suggested by the engineer. Before these additions can be agreed upon by the financial heads they must settle the details of the scheme by which they propose to finance, which will be one of the following:

A. Diversion of current profits.
B. Temporary loan to be paid out of profits, over an extended period.
C. Increase of capital of the company.
D. Issue of already existing reserve shares.

Of these, the last named is in my opinion undoubtedly the soundest and most equitable to all shareholders, for reasons which I have explained many times in other writings.

Sixth Step.—The engineer, having gained by experience a full knowledge of the mine and its capabilities, suggests that development should be advanced at such a rate that the excess tonnage of payable ore over and above that required to maintain a stipulated reserve for the primary equipment should at the end of a given period allow for a liberal margin—say six years—on an additional unit of reduction and treatment plant. Assume that the primary unit is 50 stamps with a three years' reserve of 252,000 tons of ore, and assume the first addition to be 10 stamps, requiring a reserve on a six years' basis of 100,000 tons, then when the 60 stamps begin working the reserve would stand at 352,000 tons, equivalent to 3.5 years. Development would again be pushed—provided always that the conditions permitted—to such an extent that the reserve of 3.5 years would be maintained for 60 stamps and excess tonnage gained to give six years' reserve for an additional 10 stamps, when the latter unit could be added, bringing the mill capacity up to 70 stamps and the ore reserve to 3.8 years' work for the whole mill. The same process would again be followed through, and the net result would be a gradual gain in milling power, and with each unit of addition of plant, an advance in the ratio of reserves. When five years' reserve has been built up on the lines above indicated, by which time the mill will contain 150 stamps, the question of increasing the units of addition from 10, the standard up to this point, to 15 or 20 stamps, can be safely considered, and thus throughout the mine will maintain a legitimate and perfectly sound ratio between ore reserves and equipment, and will fulfil the essential requirement of winning the ultimate profit from the mine in the shortest time consistent with sound and prudent management.

It will doubtless be said that the scheme I have outlined—indeed this whole question—is too elaborate for consideration in connection with the ordinary mining 'prospect,' because mines are frequently opened and worked by people with limited means at their command, to whom it is vital that the producing stage should be reached at the earliest possible moment, without regard to the question of ore reserves. One has to admit that the industry of mining can be conducted on widely varying principles, and expediency will often ride rough-shod over systems, but mining business which is conducted upon the method of expedients, although perhaps it is a necessary stage of such a business, cannot be regarded as either safe or substantial, and if the principles which this article is intended to elucidate do not apply in any given case, then I think so much the worse for that case.

G. A. DENNY.

Johannesburg, June 6, 1904.

THE LAW OF THE APEX.

By MAX BOEHMER.

A PROPOSITION TO SIMPLIFY IT.

All those interested in mining in the western States have been waiting for the time when the mining laws will have received their final interpretation and every one will be able to tell exactly what veins or what parts of veins in his own ground he owns and what belongs to his neighbors. It seems, however, that such is not to be the case; on the contrary, the whole matter is becoming more complex with every new decision.

The best remedy, no doubt, to cure the evil of the apex law would be to repeal it altogether and confine each owner to his surface boundaries extended vertically downward. That this has not been done seems to prove that public sentiment is still strongly in favor of a law which gives to the discoverer the right to follow his vein in depth indefinitely.

It seems strange that the experience of thirty years has brought forth no remedy for the evils complained of in every mining community. There certainly must be some way to amend the laws and free the mining industry from the incubus of interminable litigation. The alteration of a few sentences in one section of the United States Statutes would do away with all litigation arising under the present apex law, because such a change would do justice to all owners and give to each exactly that which the framers of the law intended to give him; namely, the right to follow, in depth, without limit, all veins or parts of veins which have their apex within his surface boundaries. The entire trouble so far has been caused by making the end-lines the boundaries to the rights and ownership of each claim. This, no doubt, was done because the framers of the law took it for granted that, naturally, each locator would draw his end-lines at right angles to the direction of the vein.

By making the direction of the true dip of each vein the boundary of each section of the vein located, all complications and contradictions would be avoided, and each man would be given that part of every vein the apex of which lies within his surface boundaries. This would give him the right to follow each vein on its downward course into the earth beyond his side-lines and beyond his end-lines. Since the law intends to give him the right to all veins within his lines, why should he not follow them beyond his end-lines as well as beyond his side-lines? Every man would thus receive just what he had located and what the original framers of the law intended to give him. I propose that the end-lines remain parallel, because, without such mandate, it would be possible to take more than 1,500 ft. along the vein in one claim. The accompanying sketch (Fig. 1) illustrates the boundaries of the extralateral rights of each claim according to this suggestion.

It is evident from this sketch that, under this rule, the boundary lines may not be parallel, and that, consequently, one man may be entitled to a greater length of vein in depth than he has located on the surface, and that his neighbor may receive less, all this depending on the course of the vein. This is no hardship, however, and the first locator can choose his ground. The rule will be fair, as is shown by Fig. 2, which represents an extreme and almost imposible case.

Let the outcrop of a vein be represented by

a full circle, and have a length of four full claims, as shown in Fig. 2. Each locator has 1,500 ft. at the surface, and each section of the vein lengthens as depth is gained. This would be an equitable division of the entire vein, and there could be no cause for complaint from any one. Each man would know just what he owned. There will be disputes about the exact boundaries in all cases, but these will

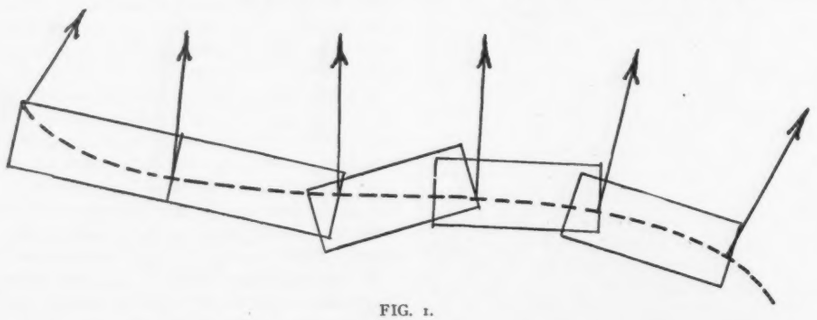


FIG. 1.

be easily adjusted if we insert a paragraph in the law which gives full directions for the manner and method of determining the dip.

The proposed amendment would equitably divide all veins in their entirety according to the locations made, each man would know his own rights, and there would be no controversy about side-lines becoming end-lines, no question in what direction to follow the vein and no controlling discovery vein or any other new dictum. It might be suggested that the direction of dip should always be determined at a certain point, and that the course thus established be continued in a straight line. This would be desirable, because easily done, and because it would establish planes as the boundaries between different owners. But such an arrangement would not be equitable in some cases, as Fig. 3 illustrates. Line *A* would represent the division if determined by the dip near the surface and continued in its own direction, while line *B* would be the division following the dip of the vein. It is evident that the latter arrangement is the more equitable. Taking everything into consideration, such an amendment ought to be a great improvement in the law. It will certainly do away with all litigation outside of the dispute as to the exact position of each boundary. The law should indicate in what manner and by what methods the direction of the dip is to be established. If this can be done, the problem is solved.

My conclusions in this matter are expressed in the proposed amendment of Section 2322 of the United States Statutes as given herewith:

"Section —— (as amended).—The locators of all mining locations heretofore made, or which shall hereafter be made, on any mineral vein, lode, or ledge, situate on the public domain, their heirs and assigns, where no adverse claim exists on the tenth day of May, 1872, so long as they comply with the laws of the United States, and with State, territorial and local regulations not in conflict with the laws of the United States governing their possessory title, shall have the exclusive right of possession and the enjoyment of all the surface included within the lines of their locations, and of all veins, lodes, and ledges throughout their entire depth, the top or apex of which lies inside of such surface-lines extended downward vertically, although such veins, lodes, or ledges may so far depart from a perpendicular in their course downward as to extend outside the vertical lines of such surface locations. But their right of possession to such outside parts of such veins or ledges shall be confined to such portions thereof as lie between boundaries following the direction of the true dip of each vein throughout, such boundary lines to be drawn through the middle of the vein at or nearest the surface where the outcrop or apex intersects the surface boundaries of the claim extended vertically downward. The direction of dip shall be determined by the local dips developed in all available openings in the vicinity, provided that no local direction of dip shall govern for more than 200 ft., nor for less than 20 ft., measured down the dip along the vein. And nothing in this section shall authorize the locator or possessor of a vein or lode which extends in its downward course beyond the

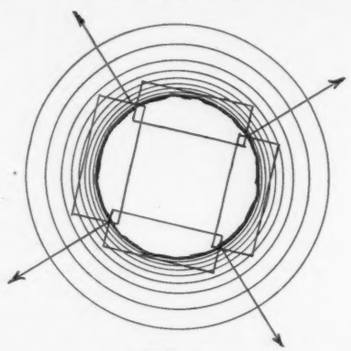


FIG. 2.

vertical lines of his claim to enter upon the surface of a claim owned or possessed by another. This Section shall take effect and be in full force at noon of January first 1908; and Section 2322 of the United States Statutes shall become null and void at the same date."

It is proposed therein that the dip be established from the apex downward, according to the local dips in all available openings in the vicinity, but that no local dip, thus ascertained, shall govern for more than 200 ft., nor for less than 20 ft., measured along the vein. This may necessitate a committee of arbitration and a joint survey in each case, but will never lead to a lawsuit of any magnitude, because the precise boundary can always be established by a sufficient number of openings. As a rule, owners will be able to establish a boundary line between their properties from point to point, as the work proceeds in depth, without any trouble whatever. The law should be passed now as a notice to all interested, but take effect and be in force not sooner than two years later. The problem, if solved satisfactorily, is of far-reaching importance. I would ask all those who have given the subject any thought, not to condemn it without further consideration, because to me it appears desirable, beyond everything else, that boundaries should be fixed by a permanent end-line.

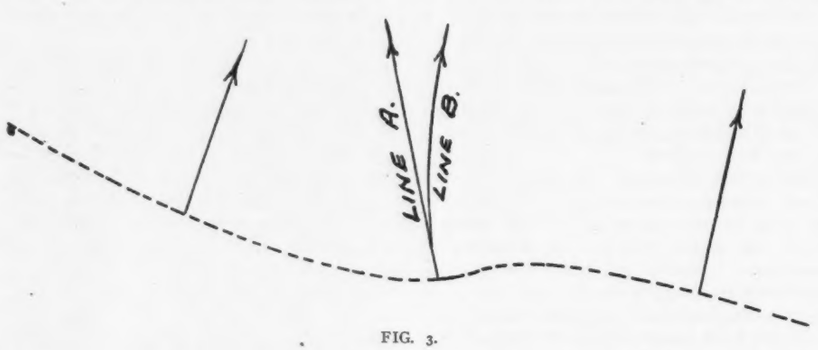


FIG. 3.

MINING IN CHINA.—United States Consul Samuel L. Gracey, at Fukien, China, reports that French mining experts have been making extensive examinations of the mineral resources of the northwestern prefectures for the last two years and have found large deposits of coal and gold. These both giving promise of very profitable returns, the Société d'Etudes du Fukien applied for mining concessions in the districts of Kienning, Shaowu, and Tungtchow. A British company during the same period was exploring mining districts in the southern part of the province in the vicinity of Amoy, but has not yet succeeded in obtaining satisfactory arrangements, since it is also asking for the privilege of constructing a railroad from the mines to tide water at Amoy. The privileges desired by this company will probably be granted at an early date. The rights are secured through the mining board at Peking and the approval of the provincial authorities.

GEOLOGICAL FIELD WORK IN NEW JERSEY.—The United States Geological Survey will have several field parties working this season in New Jersey. In co-operation with Messrs. N. D. Darton and W. B. Clark, Miss Florence Bascom will make an areal survey of the pre-Paleozoic formations of the Trenton quadrangle. Miss Bascom will also complete the mapping of the Paleozoic, pre-Paleozoic, and Pleistocene formations in the Burlington, Lambertsville, Bordentown, and Princeton quadrangles. Mr. W. S. Bayley will complete the mapping of the crystalline rocks of the Raritan quadrangle. He will also make an areal, economic, and structural survey of the crystalline rocks of the Delaware Water Gap, Easton, and Allentown quadrangles, in New Jersey and Pennsylvania. A thorough field revision of the areal and economic geology of the Franklin Furnace quadrangle will be made by Mr. A. C. Spencer, who will cooperate with Prof. J. E. Wolff in the preparation of the Franklin Furnace folio.

TRAVELING IN BRITISH SOUTH AFRICA.

By F. C. ROBERTS.

An article contributed by Mr. A. R. Townsend entitled 'Some Suggestions for Travel in Northern Mexico,' which appeared in the ENGINEERING AND MINING JOURNAL under date of February 25, 1904, has proved of so much service to me in my initial journeys into Mexico, that I am induced to contribute a few notes upon traveling in British South Africa, where I spent a number of years, in the hope of doing similar service to some fellow engineer unused to Rhodesia.

ON THE ROAD IN SOUTH AFRICA.
Note the conical-shaped 'kopje' on the extreme right.

The internal system of railroads, recently extended to the important centers of southern Rhodesia, has reduced the amount of travel by wagon, but it is still necessary to use this mode of conveyance from the present termini of the railways. The duties of the mining engineer and the relative position of the mining districts to the distributing centers at Bulawayo and Salisbury, necessitate a large amount of wagon travel; in fact, until recently, more than half the engineer's time was usually spent on the veldt, so that aside from other considerations it was necessary to give some regard to the comforts of the road.

The following articles are serviceable and require but little space: The traveler's basket, containing aluminum plates, cups, and other necessary table utensils; a folding chair and table; sparklet bottle for aerating the drinking water, and several canvas water-bags 12 in. by 15 in. deep; the last mentioned being needed for keeping the water cool during the heat of the day.

There is practically no mule or horseback travel in the country, because, by reason of the absence of high mountain ranges and large running streams, it is practicable to go almost anywhere in a wagon or cart. An attempt should be made to avoid, as far as possible, traveling during the summer months (December, January and February), because of the bad state of the roads during this, the rainy season; and it is dangerous to attempt to cross the rivers when in flood. I have often been compelled to camp on the wrong side of a river for as long as two weeks at a time. Bathing in the rivers, most of which in the dry season contain no running water, but a series of pools, is a dangerous practice, and no matter how tempting, it should be avoided, for aside from the risk of taking fever, most of these water-holes contain crocodiles.

The conveyances in general use are the Studebaker traveling wagon and the Cape cart; the latter, which is manufactured in Cape Colony, is a heavily built, high-swung, two-wheeled vehicle, containing a number of small boxes, let in and hung to every available space, in which to carry foodstuffs and other material required on a journey. When well balanced, the Cape cart is generally lighter for the animals, and offers less friction, than the four-wheelers, but in studying the comfort of the animals the occupants are apt to be endangered, because for an easily-tipped-over, absolutely uncomfortable conveyance the Cape cart would be difficult to surpass. The seating capacity is arranged for four persons, —the native "driver" and "leader," and two passengers. It is necessary to make this distinction, because once civilization is left, the driver and leader undertake the responsibilities of cooking, washing and attending to the mules (which latter office few newcomers can fill, by reason of the methods employed in breaking mules in Africa), and generally one is largely dependent upon this service.

CROSSING A SWOLLEN RIVER.

No one more readily realizes this than the natives, and as they are entirely independent, it is advisable to accord them more consideration than their habits and other characteristics invite. The duties of the driver and leader are usually filled by 'Cape boys,' a mixture of Dutch and Kaffir, natives of the Cape Colony. The driver uses only the whip, and besides keeping each mule up to its work, he directs the team and the leader; the latter holds the lines, guides the team round short turns, and incidentally manages to strike all the stones or stumps that are available. It is not difficult to find drivers in the country who know all of the roads (which are remarkably few, considering the extent of the country) and who know where to find water and fuel. One should manage to start out on a trip at such time of the day as to meet the entirely barren 'outspans' during the mid-day 'trek,' and thus be assured of shelter as well as wood and water for the night and morning 'outspans.' The Studebaker wagon, which is largely used, is so arranged that almost any comfort may be embodied. Generally they are equipped with water-tanks of 25 to 30 gal. capacity, so that before starting out it is possible to take a supply of boiled and filtered water for drinking. This is important, as the water in the country is notoriously bad. Most Kaffir kraals are situated along and near the watercourses and pools, and the drainage from the settlements finds its way to the water. Malarial and typhoid fevers, as well as dysentery, are prevalent, so that it is advisable to boil and filter all drinking water. The Studebaker wagon offers seating capacity for six persons, and the seats may be so arranged at night as to make a comfortable bed for two. It is possible to take a much larger supply of foodstuffs, as well as corn for the mules, than can be accommodated in the Cape cart; this is important, because if one is forced to purchase from the roadside store, prohibitive prices are asked for the small variety of inferior canned foodstuffs.

The roads, generally speaking, are good, although in places the heavy transport wagons cut them up badly. Mules are used almost exclusively. They are cheaper than horses, a salted mule being worth about $300; they are inured to fatigue and not so liable to the dis-

eases of the country. It is well to observe ordinary precautions, as a great many mules may thus be saved and large loss of time avoided. The most dangerous pest is a disease commonly referred to as "horse sickness" or *dinkope;* this sickness accounts for many hundreds of animals yearly. The recognized precautions to be taken are as follows: (1) The animals should be bled just before the horse-sickness season begins; (2) as far as possible they should be provided with shelter at night; (3) they should never be allowed to drink while warm and (4) under no circumstances should they be loosened for grazing in the morning, while the dew is yet on the grass.

In long journeys, 38 to 40 miles per day is usually covered. In order to subject the animals to as little fatigue as possible, the distribution of this mileage should be made as follows: The average distance per hour while traveling is six miles; from 4 a. m. to 6:30 a. m., 15 miles; 9 a. m. to 11 a. m. 12 miles; 4 p. m. to 6 p. m., 13 miles. Thus the heat of the day is avoided and camp is pitched just before dark. The mules are fed 4 lb. corn, per head, twice a day. A bag of corn weighs 200 lb. net, and it is possible to take two bags, or six days' supply, on the wagon. As a precaution against lions or other beasts of prey, at night, a *skerum,* or thorn-bush fence, is built round the mule quarters—in Africa every thorn has its bush—and the camp-fire is kept burning till daylight.

It is not necessary to be able to speak the language of the natives, as one is in no sense dependent upon them, and a few words in Dutch are enough for the drivers, many of whom speak broken English. About the only food which the natives raise consists of mealies (corn) and beans. Sometimes it is necessary to buy corn for the mules, and occasionally one can obtain milk, but the native is generally short of food himself, so that it is better not to depend even upon obtaining these articles. It might be remarked, however, that without the native the prospector in Rhodesia would have made a sorry showing. It has only been necessary for the prospector to learn the words *nidala umgudene,* meaning "ancient mine" or "old working," fortified with this, a span of donkeys, and a month's provisions, together with a few discovery notices, he was fully equipped.

In starting on a trip, avoid canned goods. Potatoes, onions, eggs, coffee, tea, sugar, salt, Boer meal for bread, butter, and condensed milk are about all one requires, as the country teems with horned game, wild pig and a large variety of birds. If it is considered necessary to take any canned fruit or vegetables, the contents should never be left in the tin after it has once been opened, but should be transferred to a glass jar for future use.

Settlements are far apart, and the chances being so favorable for contracting malaria or dysentery, it is desirable to take the following medicines: Chlorydine, quinine, castor oil and brandy. A small bottle of ammonia and one of eucalyptus oil are also useful for insect bites. A mosquito net of fine mesh should be carried, for besides the *anopheles* and the *culex,* there are large varieties of other insects, which attack the wayfarer at night. The altitude of most of the mining camps is above 2,000 ft.; so that, although the days are sometimes hot, one can generally find comfort under a blanket at night. In winter time—May, June, July—the temperature often drops to 40° F., and even to the freezing point.

The usual attire for the veldt is a thick pair of corduroy riding breeches, with leather leggings, flannel shirt and wide-brim soft felt hat. The changes in temperature are sudden, and it is therefore inadvisable to discard medium for light-weight underclothing during the day. For early morning travel a heavy woolen sweater is a most useful garment. Firearms are only necessary for protecting the mules from attack and for shooting game, as the natives are no longer dangerous. It is always well to avoid the native kraals, when camping, as the natives are very dirty, and are apt to pilfer.

The annual expense incurred in the upkeep of wagon (valued at $1,000) and eight mules (valued at $2,400), including the wages and food of the driver and leader, together with other incidental expenses, is approximately as follows:

One driver at $40 per month	$480
One leader at $22.50 per month	270
Food for 8 mules, 8 lb. per head per day	960
Repairs to wagon, shoeing mules, etc.	174
"Boys'" food	360
Whips, etc.	60
Rope, grease and incidentals	120
Total	$2,424

Before leaving town, one should satisfy oneself that the following articles are on the wagon: 50 ft. of ¾-in. rope, wrench, axe, water-bucket, tarpaulin, axle grease, and an assortment of bolts, nuts and nails.

THE PORCUPINE PLACER DISTRICT, ALASKA.—A region in southeastern Alaska that has recently come into prominence as gold-producing is the Porcupine placer mining district. Porcupine creek is a stream, about five miles in length, which enters Klehini river from the south 12 miles above its junction with the Chilkat. The district has been described in a brief article by Mr. Charles W. Wright in *Bulletin* 225 of the United States Geological Survey. The Porcupine placer diggings date from the summer of 1898, when they were discovered by three prospectors who were on their way to the interior. After the rush to this creek in 1898 and 1899, there was but little development until 1900, when several of the claim holders bonded or leased their properties, while others formed companies in order to obtain means to operate on a large scale. The peculiarities of the occurrence of the placers require a still further combination of interests for economic exploitation, and negotiations are now on foot to bring the entire creek under a single management. The only claims on the Porcupine that are at present developed are Discovery No. 2, below Discovery, and the Chisholm and Woodin claims on McKinley creek. To work the creek gravels it is first necessary to divert the stream into a flume built at one side of the channel and then to install a derrick to remove the large granite boulders, some of which weigh several tons and have to be blasted. After this a hydraulic plant must be erected. Placer gold is found in workable deposits from the mouth of Porcupine creek to McKinley creek, its eastern tributary, a distance of three miles, and from this point for a mile or more up McKinley creek. The total production of the Porcupine basin since its discovery is estimated at $450,000 in gold.

PYRITE SMELTING. A REVIEW.—VII.

By EDWARD D. PETERS.

THE PART PLAYED BY LIME IN PYRITE SMELTING.

None of the replies to the question covering the percentage of lime necessary to clean the slags, indicate that any particular specific virtue is attached to lime *per se,* as a cleanser of the slag from valuable metals. I think I am fairly interpreting the unanimous spirit of the contributors by stating that what they demand is a slag from which the matte will separate satisfactorily; that such a slag must be tolerably silicious, yet fusible; and, moreover, that it is advantageous to have it contain a fair proportion of earthy bases, so that it may not have too high a specific gravity. In the great majority of cases there is no substance that will fill the bill so completely, and produce the results just enumerated so cheaply and satisfactorily, as lime.

As a flux for excess silica, up to a certain limit, 1 lb. of lime will go as far as 2.58 lb. of ferrous oxide. This comes from the fact that not only is the atomic weight of lime considerably smaller (and, consequently, its oxygen contents larger) than that of ferrous oxide, but, that in the oxidizing atmosphere of the pyrite furnace (as clearly pointed out by Carpenter and Lang), the silica prefers to make only a bisilicate with lime, while it forms a *singulo*-silicate with ferrous oxide; and as the slag that we prefer to make in pyrite smelting will have an oxygen ratio of acid to base of somewhere about 1½ to 1, and is thus a mixture of the bisilicate of lime with the singulo-silicate of iron, it follows that, until we have reached our maximum desirable limit of lime in the slag, each pound of lime (forming a bisilicate) will go as far as 2.58 lb. of ferrous oxide (forming a singulo-silicate).

The actual percentage of lime necessary to effect a good mechanical separation of the matte varies so greatly under differing conditions that it is impossible to lay down any fixed rules in regard to it. A glance at the large table of questions and answers will show that most of the replies are based upon the local conditions under which the contributor is operating, and are most valuable when considered in connection with these conditions.

A few of the correspondents have given replies based on more general conditions. Austin says: "Slags containing as little as 5 per cent of lime have proved clean."

Carpenter avoids lime as far as possible in genuine pyrite smelting, not that he does not value the type of slag that it makes, but because it increases the *quantity* of slag, and takes the place of ferrous oxide in combining with the silica. He says: "I think, all things considered, and, especially, if the ores carry alumina, lime had better be avoided, particularly in the first smelting."

Lang values greatly the qualities of a slag containing a suitable proportion of lime, but suggests that there are often occasions where it is commercially more advantageous to get along without it, and says that reasonably clean slags can be made where ferrous oxide is almost the sole base.

Lloyd expresses very much the same views as the preceding writer, and emphasizes the important point that, as a slag consisting mainly of ferrous silicate is heavy, and difficult for the matte to separate from, it becomes

all the more necessary, in such cases, to provide peculiarly favorable conditions for the separation of slag and matte. Such, for instance, are large forehearths, maintained at a high temperature.

I think, therefore, that the pyrite smelter may assume that lime has no specific virtue in cleansing the slags, but that—apart from its great importance as a basic flux where too much silica is present—its main value is to make the slag lighter in weight, so that the matte globules can separate more quickly and more perfectly from it.

PIG IRON PRODUCTION IN GERMANY.—The German Iron & Steel Union reports the total output of the blast furnaces in Germany in May at 867,477 tons, which is 34,279 tons more than in April. For the five months ending May 31, the total iron made was as follows, in metric tons:

	1903.	1904.	Changes.
Foundry iron	738,274	742,534	I. 4,260
Forge iron	378,008	344,257	D. 33,751
Steel pig	315,936	245,755	D. 70,181
Bessemer pig	168,216	193,559	I. 25,343
Thomas (basic) pig..	2,473,351	2,636,523	I. 163,172
Totals	4,073,785	4,162,628	I. 88,843

Steel pig includes spiegeleisen, ferro-manganese, ferro-silicon, and all similar alloys. The increase was almost entirely in basic iron.

MEXICAN COINAGE.—A remarkable compilation by the Government of Mexico of the coinage in the republic since the days of Cortez gives some interesting totals. It refers to the coinage of gold, silver and copper and covers the long period from 1535 to 1901. The coinage from 1535 to 1821, colonial period, $2,150,635,637; 1822 to 1901, independence period, $357,317,239; total in 366 years, $2,507,952,876. Out of this enormous aggregate, the silver coinage during the colonial period was:

Silver	$2,081,217,785.95
Gold	68,874,958.00
Copper	542,893.37
Total	$2,150,635,637.32

Since Mexico became an independent State the amount was:

Silver	$332,986,025.73
Gold	18,147,373.00
Copper	6,133,789.77
Bronze	50,050.00
Total	$357,317,238.50

It will be seen that 96 per cent of the total was in silver coins.

GEOLOGICAL SURVEY WORK IN THE SOUTHWEST.—The United States Geological Survey will carry on the following field work during the present season: Areal and economic surveys of the Sansbois, McAlester, Tuskahoma, and Windingstair quadrangles, Indian Territory, will be made by Mr. J. A. Taff, assisted by Mr. E. O. Ulrich. Mr. F. C. Schrader will make an areal and economic survey of the Independence quadrangle, Kansas, assisted by Professor Erasmus Haworth, who will study the underground structure in its relation to the accumulation of oil and gas. Professor A. H. Purdue will make an areal and economic survey of the Winslow quadrangle, Arkansas, and, if time permits, will investigate the developed slate deposits of Arkansas. Mr. E. C. Eckel will visit northeastern Texas, particularly Marion, Cass, Morris, Camp, Harrison, and Upshur counties, for a reconnaissance examination of iron-ore deposits and to determine the areas in which topographic and geological work can advantageously be taken up next year.

COAL MINING IN THE CROW'S NEST PASS.

BY AN OCCASIONAL CORRESPONDENT.

In November, 1897, the pioneers of coal mining in the now celebrated Crow's Nest Pass pitched their camp on Coal creek, five miles east of the site where the town of Fernie now stands. In August of the following year the railway, then under construction, reached that point and the shipment of coal commenced forthwith. Development was slow in consequence of natural difficulties and a restricted market. The former were due mainly to the irregular dip of the seams, which varies constantly and ranges from 5 to 35 deg. and to the extremely friable nature of the coal, which has rendered the mines dry and dusty from the start, and caused the pillars to crush and necessitated numerous changes in the plan of the underground workings.

In addition to these difficulties a terrible explosion at the Coal Creek mines on May 22, 1902, resulted in the death of 130 men and completely wrecked the workings so that it has taken two years to repair the damage and bring the mine up to its former capacity.

These are the reasons why after nearly seven years' operation the output of three separate groups of mines, with about 12 openings, has attained only a total of 2,500 tons a day. Meanwhile, in addition to the plant at Coal creek, consisting of three mines and 400 coke ovens, new mining towns have been established by the Crow's Nest Pass Coal Company at Michel, 20 miles north, and at Morrissey, 10 miles south; and coking plants of 400 ovens have been erected at the former, and of 200 at the latter, which also enjoys the advantage of being connected with the Great Northern Railway. At present the capacity of Coal Creek and Michel is about equal, 1,000 tons a day, while Morrissey yields from 500 to 800 tons.

When the Coal Creek mines were first opened, analysis of average shipments of raw coal gave 5 per cent ash, and the coke from 8 to 10 per cent. The ash in Michel coal ranges from 10 to 12 per cent, and in the coke from 18 to 20 per cent. At Morrissey the ash is about the same as at Coal Creek, but there is an unaccountable difference in the physical character of the coke, it being denser and harder. This same peculiarity is found in the coke produced on the Alberta side of the Rockies in the Blairmore district, where operations are being conducted in what are believed to be the same seams. This goes to confirm the experience of all coke manufacturers that coal of precisely the same analysis will yield coke of different physical structure.

At all the mines of the Crow's Nest Pass Coal Company development work continues, the most modern equipment is being added, and capital outlay has reached $4,500,000. The company has paid four annual dividends of 10 per cent each. The best judges doubt whether this splendid property has yet yielded any working profit in view of the cost of production, which last fiscal year was in the neighborhood of $1.70. The demand for more capital is still insistent and the sale of debentures goes on. The reason for this is not far to seek. In addition to the difficulties encountered in opening the property, there are two known factors, and one suspected, which account for the depression undoubtedly existing at the Pass. Increased competition and over-production for the Canadian market are the two known factors. Difficulty with Mr. J. J. Hill is the suspected third.

Until two years ago the Crow's Nest Pass Coal Company had an absolute monopoly of the Canadian market. The Canadian Pacific Railway Company consumed 1,000 tons a day of the coal and would have been glad of 2,000 tons; the British Columbia smelters required 500 tons of coal and 300 tons of coke daily, and the general market took at least 500 tons of coal. In addition, Mr. J. J. Hill, who had acquired a very large interest (admittedly 40 per cent) in the concern, built a branch of the Great Northern into Morrissey and was literally clamoring for fuel, declaring that he wanted 10,000 tons daily.

Recently the Canadian Pacific Railway and the largest smelting company, the Granby, have acquired coal-lands and begun to open them. H. L. Frank, of Butte, purchased a large area on the Blairmore coal-field in 1901 and within less than two years had reached an output of 1,000 tons a day. All this went to the Canadian Pacific Railway. The Granby Consolidated Company acquired immense tracts in the same fields, and under the title of the International Coke & Coal Company is rapidly producing its own requirements; and a French syndicate, organized by Mr. J. Fleutot, has opened three distinct groups of mines only a few miles east of the Granby Company under the title of the West Canadian Collieries, Ltd. The present output of these new concerns is in the neighborhood of 2,000 tons daily and will be doubled during the present season. The effect of this is seen in the partial closing of the Coal Creek and Michel mines, and in the temporary laying off of the Morrissey mines, which have been idle several weeks. It is singular that at this critical juncture Mr. J. J. Hill is taking reduced tonnages of Crow's Nest coal, and although such a large shareholder, is content to buy inferior coal elsewhere. Some people are asking the reason, and the answer may have an important bearing on the future of the Crow's Nest Pass Coal Company. The general impression is that Mr. Hill will shortly close a long pending deal for control of the property, a view which is strengthened by the fact that he has begun to extend the Great Northern Railway from Morrissey to Fernie.

SODIUM CYANIDE.—Advance has been rapid in recent years in the manufacture and consumption of this new chemical as a substitute for the 98 to 100 per cent double cyanide of potassium and sodium for the extraction of gold. The single salt cyanide of sodium was first made commercially at the extensive plant of the Scottish Cyanide Company, at Leven, in the Fife coal-field, in Scotland. Here the Readman patented method is employed, by which barium cyanide is produced electrically first; then it is converted by a wet chemical process into sodium cyanide, and finally the crystals are compressed into briquettes of even weight for market. This cyanide claims the advantages of high cyanogen strength (120 to 125 per cent equivalent of potassium cyanide, or 53.1 lb. cyanogen and 46.9 lb. sodium); great extractive powers by authoritative assay from 5.93 to 7.99 per cent better than potassium cyanide; economy in handling, as it is pure and compact in form; greater solubility than the fused double salt cyanide; freedom from alkaline sulphides, and less labor at mines. Many other manufacturers, employing the old fusing method, are now marketing sodium cyanide, but some still have customers who, for special reasons, insist on having the double salt.

STEEL TO REPLACE TIMBERING.

By R. V. NORRIS.

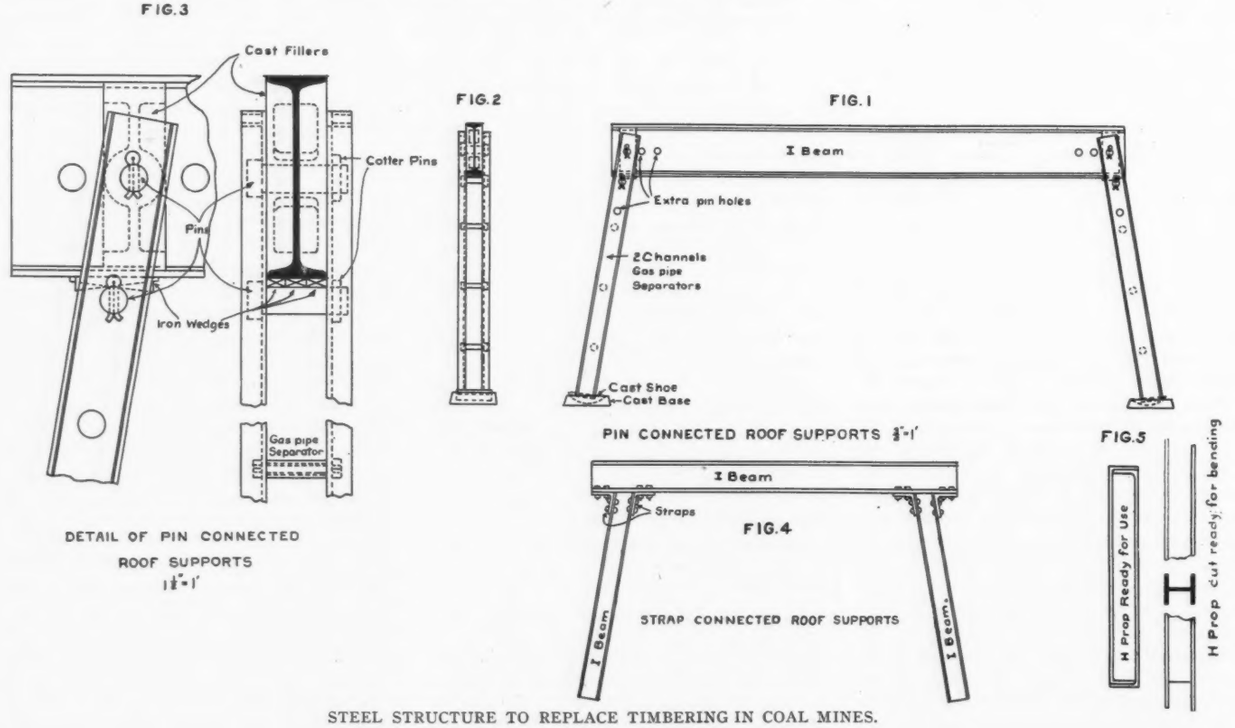
The constantly increasing cost of mine timber and its very short life, particularly in damp mines, has led a number of the anthracite operators to experiment on the use of steel rolled shapes to replace the heavy timbering required at the bottoms of shafts and slopes, in underground pump-rooms, and on wide turnouts. In the early attempts to use steel the roof was supported with old rails, either straight or bent to the arc of a circle, usually resting on walls of masonry, or of dry stone. While such supports were quite satisfactory, the ordinary mine rail is too light for the larger spans required, and the metal is badly distributed for economical use as a beam.

Two types of rolled shape supports are now in rather extensive use in the region, the pin-connected type, Fig. 1, 2 and 3, and the strap-connected, Fig. 4. The former consists of an I-beam cap, with posts constructed of two channels of suitable size, connected by pins and wedges, as shown in detail in Fig. 3. This has the advantage of being easily erected even in somewhat cramped situations; it will stand a considerable amount of side movement without damage, and the posts may be proportioned strictly as such, or may be of sufficient strength to take considerable side pressure. The ends of the post channels fit in a cast shoe which has a cylindrical bottom resting in a cast base, so that the latter may be set level and the posts given any reasonable batter desired. Extra pin-holes are drilled in both I-beams and channels, so that a considerable adjustment of both height and width is possible.

The strap type of steel structure used by the coal companies of the Pennsylvania Railroad has I-beams for both cap and posts, the latter beveled for the batter desired, and all connected by angle-straps bolted or rivetted to place. This type, while cheaper than the pin-connected, is harder to erect, has no side flexibility, any movement of this sort tending to disrupt the connections; and it must have a fixed batter, which is not always convenient.

In designing such steel supports it is usual to figure from the strength of timber which is known to stand, temporarily, at least, in the same or a similar position. The table on the next page was calculated to facilitate such comparison and has been found of great value in properly proportioning such supports. Filler, shoe and base castings can be made standard for each size of shape, but the pins must be designed for each particular case of weight and span, the weak point being in the bearing of the pin in the channels, with the danger of crushing the thin metal in the web. For this reason it is usually desirable to use the heaviest shapes rolled, of the necessary strength, so as to reduce the size of pin required.

MINE GALLERY, WITH STEEL PROPS. TRACK COVERED WITH WATER.



STEEL STRUCTURE TO REPLACE TIMBERING IN COAL MINES.

The photograph shows this timbering in the drift at the head of No. 2 Bear Valley shaft of the Summit Branch Mining Company.

STRENGTH OF MINE TIMBER AND STEEL SUPPORTS.

Ultimate strength per sq. in.	Tension.	End compression.	Compression across grain.
Hemlock	8,700 lb.	5,300 lb.	1,100 lb.
Chestnut	10,500 "	5,300 "	1,600 "
White pine	11,500 "	5,400 "	1,200 "
White oak	14,800 "	7,000 "	1,600 "
Southern yellow pine	15,900 "	8,500 "	2,600 "

Steel safe load, factor 4.
Tension, 16,000 lb. sq. inch.
Compression, 12,000 lb. up to $l = 90\ r$.
" 17,100 " $- 57\ \frac{l}{r}$ above $l = 90\ r$.
l = Length in inches.
r = Radius of gyration.

Strength of Round Timber Caps. Safe loads in 1,000's of pounds uniformly distributed. Factor of safety 4.

SPAN IN FEET.

Dia.	6. Hem.	6. Oak.	6. S.Y.P.	8. Hem.	8. Oak.	8. S.Y.P.	10. Hem.	10. Oak.	10. S.Y.P.	12. Hem.	12. Oak.	12. S.Y.P.	14. Hem.	14. Oak.	14. S.Y.P.	16. Hem.	16. Oak.	16. S.Y.P	18. Hem.	18. Oak.	18. S.Y.P.	20. Hem.	20. Oak.	20. S.Y.P.	24. Hem.	24. Oak.	24. S.Y.P.	30. Hem.	30. Oak.	30. S.Y.P.
4"	.9	1.2	1.5	.7	.9	1.1	.5	.7	.9	.5	.6	.7	.4	.5	.6	.3	.4	.5	.3	.4	.5	.3	.4	.4	.2	.3	.4	.2	.2	.3
6"	3.1	4.1	5.0	2.3	3.1	3.8	1.9	2.5	3.0	1.6	2.1	2.5	1.3	1.8	2.1	1.2	1.5	1.9	1.3	1.4	1.7	.9	1.2	1.5	.8	1.0	1.3	.6	.8	1.0
8"	7.3	9.8	11.8	5.5	7.3	8.8	4.4	5.9	7.1	3.6	4.9	5.9	3.1	4.2	5.1	2.7	3.7	4.4	2.4	3.3	3.9	2.2	2.9	3.5	1.8	2.5	3.0	1.5	2.0	2.4
10"	14.4	19.1	23.1	10.8	14.3	17.3	8.6	11.5	13.9	7.2	9.6	11.6	6.2	8.2	9.9	5.4	7.2	8.7	4.8	6.4	7.7	4.3	5.7	6.9	3.6	4.8	5.8	2.9	3.8	4.6
12"	24.9	33.0	39.9	18.7	24.8	29.9	14.9	19.8	23.9	12.4	16.5	20.0	10.7	14.1	17.1	9.3	12.4	14.7	8.3	11.0	13.3	7.5	9.9	12.0	6.3	8.3	10.0	5.0	6.6	8.0
14"	39.5	52.4	63.4	29.6	39.5	47.6	23.7	31.4	38.0	19.8	26.2	31.7	16.9	22.5	27.2	14.8	19.6	23.8	13.2	17.5	21.1	11.9	15.7	19.0	9.9	13.1	15.8	8.0	10.5	16.8
16"	59.0	78.0	95.0	44.3	57.5	71.2	35.4	46.8	57.0	29.5	39.0	47.5	23.9	33.4	40.7	20.9	29.3	35.6	19.7	26.0	31.7	16.7	23.4	28.5	14.8	19.5	23.8	11.8	15.6	19.0
18"	84.0	111.0	135.0	63.0	83.3	101.3	50.4	66.6	81.0	42.0	55.5	67.5	36.0	47.6	57.9	31.5	41.6	50.6	28.0	37.0	45.0	25.2	33.3	40.5	21.0	27.8	33.8	16.8	22.2	27.0
20"	115.0	153.0	185.0	86.2	114.8	138.8	69.0	91.8	111.0	57.5	76.5	92.5	49.3	65.6	79.3	43.1	57.4	69.4	38.3	51.0	61.7	34.5	45.9	55.5	28.8	38.2	46.2	23.0	30.6	37.0
24"	200.0	264.0	319.0	150.0	208.0	239.2	120.0	158.4	191.4	100.0	132.0	159.5	85.7	113.1	136.7	75.0	99.0	119.6	66.7	88.0	106.3	60.0	79.2	95.7	50.0	66.0	79.8	40.0	52.8	63.8

Strength of Round Timber Posts. Load in 1,000's of pounds. Factor of safety, 4 to 5. No post should be used more than 40 diameters in length.

HEIGHT IN FEET.

Dia.	6. Hem.	6. Oak.	6. S.Y.P.	8. Hem.	8. Oak.	8. S.Y.P.	10. Hem.	10. Oak.	10. S.Y.P.	12. Hem.	12. Oak.	12. S.Y.P.	14. Hem.	14. Oak.	14. S.Y.P.	16. Hem.	16. Oak.	16. S.Y.P.	18. Hem.	18. Oak.	18. S.Y.P.	20. Hem.	20. Oak.	20. S.Y.P.	24. Hem.	24. Oak.	24. S.Y.P.	30. Hem.	30. Oak.	30. S.Y.P.
4"	7.7	8.9	10.9	6.6	7.6	9.2	5.5	6.4	7.7	4.6	5.3	6.5																		
6"	28.2	23.2	20.0	18.4	21.2	25.8	16.6	19.2	23.4	14.9	17.2	20.9	13.3	15.3	18.6	11.7	13.6	16.5	10.3	12.0	14.6	9.2	10.6	13.0						
8"	37.7	43.6	53.1	35.6	41.2	50.0	33.4	40.4	46.1	31.1	35.9	43.7	28.7	33.2	40.4	26.9	30.5	37.1	22.8	28.1	36.1	22.1	25.6	31.1	18.4	21.4	25.9			
10"	61.2	70.7	86.4	58.2	67.2	81.9	55.5	64.2	78.1	52.8	61.1	74.3	50.0	57.8	70.3	47.0	54.4	66.1	44.1	50.9	62.0	41.2	47.7	57.9	35.8	41.4	50.3	28.8	33.4	40.5
12"	89.4	103.3	126.0	86.2	99.7	121.5	83.1	96.1	116.9	79.9	92.4	112.4	76.7	88.7	107.9	73.3	84.8	103.2	69.8	80.8	98.2	66.3	76.6	93.2	59.3	68.6	83.4	49.7	57.5	69.9
14"	123.2	142.5	173.3	119.5	138.1	168.3	114.4	132.4	163.7	112.6	130.1	158.5	108.9	125.9	153.2	104.1	120.3	146.5	101.2	116.9	142.1	93.3	107.9	131.7	89.0	102.7	125.0	77.0	89.3	108.3
16"	160.8	185.9	226.1	159.0	183.7	224.1	154.8	178.9	218.1	150.6	174.1	212.1	146.8	169.2	206.0	142.1	164.4	200.0	137.9	159.4	193.9	133.5	154.4	187.7	124.2	143.7	174.7	110.1	127.2	154.8
18"	204.0	235.9	286.9	202.7	234.6	285.6	199.4	230.3	281.0	194.6	224.9	274.1	189.7	219.6	267.2	185.1	213.9	260.9	180.3	208.6	253.7	175.4	202.9	247.1	165.5	191.2	232.8	149.7	172.9	210.4
20"	251.0	290.4	353.2	251.2	290.4	353.2	248.4	287.0	350.1	243.0	281.0	342.6	237.7	274.4	335.0	232.7	268.8	327.5	227.3	262.8	319.9	222.0	256.9	312.0	211.3	244.6	296.1	194.1	224.5	272.9
24"	361.7	418.2	508.5	361.7	418.2	508.5	361.7	418.2	508.5	357.6	413.2	503.9	351.3	406.0	494.9	345.0	398.8	485.9	338.6	391.5	476.9	332.3	384.3	467.8	319.7	369.8	449.9	300.2	347.2	422.3

Note.—All the above for seasoned timber. Green timbers may have as low as 2-3 above strength.

Strength of Iron Caps. Safe loads in 1,000's of pounds uniformly distributed. Factor of safety, 4.

SPAN IN FEET.

Desc. of beam.	Weight, lb. per ft.	6.	8.	10.	12.	14.	16.	18.	20.	24.	30.
8" I	18	25.3	18.9	15.2	12.6	10.8	9.8	8.4	7.6		
10" I	25	43.4	32.6	36.0	21.7	18.6	16.3	14.5	13.0	10.9	8.7
12" I	31.5	64.0	48.0	39.4	32.0	27.4	24.0	21.3	19.2	16.0	12.8
15" I	42	104.7	78.5	62.8	52.4	44.9	39.3	34.9	31.4	26.2	20.9
18" I	55	157.2	117.9	94.3	78.6	67.4	58.9	52.4	47.2	39.3	31.4
20" I	65	207.9	156.0	124.8	104.0	89.1	78.0	69.3	62.4	52.0	41.6
24" I	80	309.3	232.0	185.6	154.7	132.6	116.0	103.1	92.8	77.3	61.9

Strength of Iron Posts. Safe loads in 1,000's of pounds. Factor of safety, 4.

HEIGHT IN FEET.

Desc. of beam.	Weight, lb. per ft.	6.	8.	10.	12.	14.	16.	18.	20.	24.	30.
8" I	18	63.9	56.5	47.7	39.2	30.4	21.6	13.1	4.3		
10" I	25	88.4	81.1	70.2	58.8	47.5	36.5	25.2	13.9		
12" I	31.5	111.1	108.2	95.5	83.4	70.7	58.1	45.4	32.7	7.9	
15" I	42	148.8	148.8	135.7	118.8	103.3	86.7	71.1	55.5	23.5	
18" I	55	191.2	191.2	177.1	158.9	139.8	120.8	100.8	82.6	45.4	
20" I	65	228.9	228.9	218.6	196.8	175.1	154.5	131.6	109.8	67.4	
24" I, Web	80	279.8	279.8	279.8	257.9	233.9	211.3	190.2	164.8	116.9	46.6
2-6" C's, 2-10	8	57.2	57.2	57.2	57.2	57.2	57.2	56.2	53.4	47.8	39.6
2-6" C's, 44-100	13	91.6	91.6	91.6	91.6	91.6	90.6	85.6	80.6	72.6	56.6
2-7" C's, 21-100	9¾	68.4	68.4	68.4	68.4	68.4	68.4	68.4	68.4	62.8	54.3
2-7" C's, 42-100	14¾	104.2	104.2	104.2	104.2	104.2	104.2	104.2	101.0	91.4	77.2
2-8" C's, 22-100	11¼	80.4	80.4	80.4	80.4	80.4	80.4	80.4	80.4	79.2	70.4
2-8" C's, 4-10	16¼	114.8	114.8	114.8	114.8	114.8	114.8	114.8	114.8	109.2	95.6
2-10" C's, 24-100	15	107.0	107.0	107.0	107.0	107.0	107.0	107.0	107.0	107.0	105.2
2-10" C's, 53-100	25	176.4	176.4	176.4	176.4	176.4	176.4	176.4	176.4	176.4	165.6
2-12" C's 28-100	20½	144.8	144.8	144.8	144.8	144.8	144.8	144.8	144.8	144.8	144.8
2-12" C's, 51-100	30	211.6	211.6	211.6	211.6	211.6	211.6	211.6	211.6	211.6	211.6

Diameter of Pins. Two pins in each post. Double thickness of web in channel.

Load on post.	4-10".	5-10".	6-10".	7-10".	8-10".	9-10".	1".
10,000 lb.	1"	—	—	—	—	—	—
20,000 "	2⅞"	1¾"	1⅜"	1¼"	1"	—	—
30,000 "	3⅛"	2½"	2⅛"	1¾"	1⅝"	1⅜"	1¼"
40,000 "	4¼"	3⅜"	3⅛"	2¾"	2⅛"	1⅞"	1⅝"
50,000 "	5¼"	4¼"	3½"	3"	2⅝"	2⅜"	2⅛"
60,000 "	—	5"	4½"	3⅜"	3⅛"	2¾"	2½"

While these pin-connected steel supports cost about three times as much as oak timber, their life is very much greater; the first of this type put in about eight years ago are still in excellent condition, while the 24-in. oak timber sets which they replaced lasted less than ten months in the same position, failing by the gradual crushing of the posts into the caps.

The usual protection to the steel consists of two coats of paint at the mill and a third heavy coat of tar paint just previous to erection.

A very interesting steel prop in use in some of the English collieries is shown in Fig. 5; this consists of an H iron, 4 by 4 in., or 6 by 6 in., specially rolled for the purpose; the web is cut away at both ends and the flanger turned down, making very efficient ends. These props are said to be used in longwall workings and are removed as the work progresses.

GEOLOGICAL FIELD WORK IN NEW YORK.—The United States Geological Survey will have several field parties in New York this season. Professor R. S. Tarr will complete his investigation of the Pleistocene geology of the Watkins Glen quadrangle, and will prepare the Pleistocene section for the Watkins Glen folio. He will also investigate the Pleistocene geology of the Harford-Owego quadrangle, and prepare the Harford-Owego folio in co-operation with Professor H. S. Williams. Professor Williams, assisted by Dr. E. M. Kindle, will make an areal and economic survey of the quadrangle that embraces the Dryden, Harford, Owego, and Appalachian quadrangles. Professor J. F. Kemp will continue the areal and economic survey of the eastern part of the Adirondack region.

ELECTRIC POWER IN ST. LOUIS.—The St. Louis Transit Company, which operates the larger part of the street car system in St. Louis, has found itself short of power ever since the World's Fair began to attract large numbers of visitors. The traction plant was working at an almost constant 50 per cent overload, and at rush hours the excess reached extreme proportions. The Transit Company has now applied to the World's Fair authorities for additional power, with the result that Governor Francis and the Fair administration have, by contract, put at the service of the railway company during the day, from 2 until 7 p.m., when the loads are heaviest, the service of the huge Allis-Chalmers engine in the Machinery Building. This engine, which is coupled to a Bullock electric generator, and which, when operating at 75 revolutions per minute, at a steam pressure of 150 lb., and operating non-condensing, is capable of developing 8,000 h.p., is a central feature in the Machinery Building. From 8 p. m. until the Fair Grounds close, this powerful unit supplies the current for the decorative lighting of the buildings and grounds, which forms a conspicuous attraction of the Exhibition. The lighting requires 200,000 incandescent lamps. The traction load which the engine and generator will now carry by contract between the Transit Company and the Exposition authorities will be at least 3,000 h. p. to begin with, and may be much increased as the World's Fair crowds are augmented.

HEAD-FRAMES AND TIPPLES.

By W. R. CRANE.

The design of head-frames in the Mississippi Valley, especially at shafts sunk for coal and salt, is quite varied, even in the most modern constructions. The conditions which chiefly determine the design are position and utility; the latter having the most direct bearing upon the economical handling of the mine product. The head-frames of shafts at non-metalliferous mines are, as a rule, provided with facilities for sizing and storing, and, in some cases, hand-picking of the marketable products, thus requiring a radical change in the general design; the resulting structure is known as a tipple. The effect of position is not so marked, because the country is, as a rule, level and the deposits horizontal.

Besides position and utility there are other factors modifying the design, among the most obvious being strength, stability, durability and cost.

The head-frames are not very high, especially in the tipple forms; the usual height is about 50 ft., with 90 to 100 ft. as a maximum. The strength must necessarily be proportionate to the height, because of the action of both wind and other strains peculiar to hoisting. The effect of wind pressure at 30 or 40 lb. per sq. ft. is no small item; therefore, extra large bases, greater than needed for hoisting purposes alone, are required. An increase in width and length of 5 and 10 ft. should be allowed for every 25 ft. increase in height of frame, so as to offset wind pressure.

In this region the head-frames are usually built for balance winding, and are, therefore, adapted to two-compartment shafts; if increased capacity is desired, another shaft is sunk, which is preferable to increasing the number of compartments of a single shaft. The sheaves are then placed at equal distances from the sides of the top of the frame, so that the side strains and twisting effect of hoisting are reduced to a minimum.

In head-frames proper, that is, those independent of other constructions, the posts are given a batter which varies largely with the height and ranges from 1 to 6 with frames of 50 ft. and under, to 1 to 7 with those between 50 and 100 ft. high.

The timbers that enclose and form the shaft, and serve largely as guide supports, stand vertically at the corners of the compartments, and may support the sheaves on cross-beams at the top, or may extend only a few feet above the landing, the sheaves being mounted upon the posts of the first bent. The former construction is usual with tipples, while the latter is probably more commonly employed with the separate and independent constructions.

The back-stays are usually set at an angle of 45° (range 30° to 50°) with the posts supporting the sheaves; this may be now accepted as a pretty well established rule, especially with tipples. This arrangement simplifies the design, as it fixes the position of the foot of the stay as well as that of the hoist, the back stay bracing against the foundation of the hoist. When the foot of the back stay rests upon the hoist foundation, as is common practice, the drum is but a few feet distant from it. The cables then, especially the under one, approach very close to parallelism with the back stay. Probably a more common arrangement is to have the line bisecting the angle between the two cables parallel with the back stay, which does not,

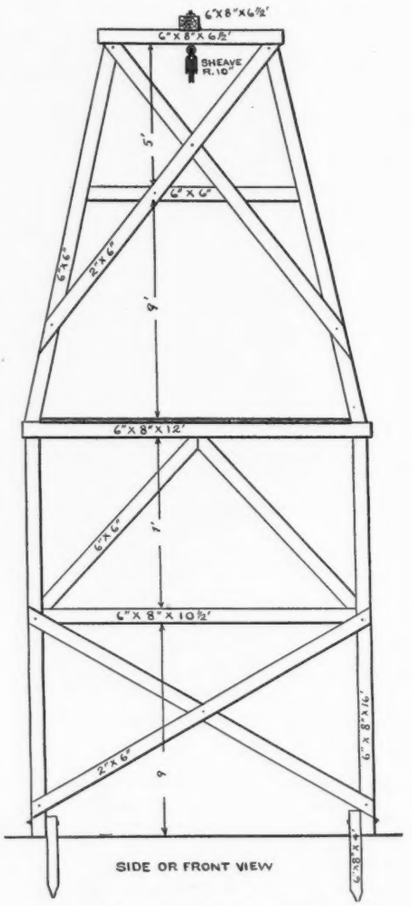


FIG. 1—SMALL FOUR-POST FRAME FOR LEAD AND ZINC MINES.

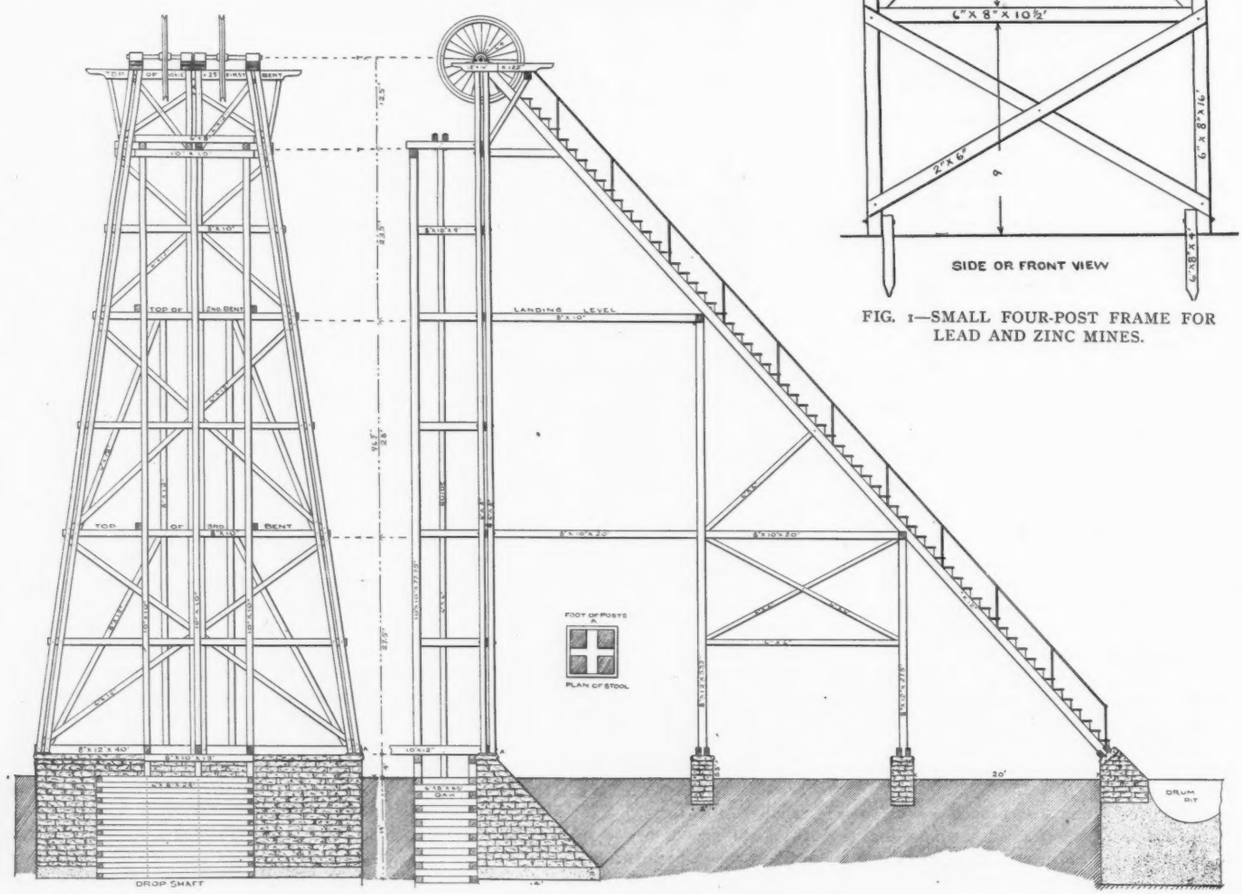


FIG. 2—HEAD-FRAME AT KANOPOLIS, KANSAS.

however, materially differ from the arrangement given above.

In the tipple type of head-frame the series of strongly built bents arranged for the support of the screens and pockets, which connect with and extend from the head-frame proper in a direction opposite to that of the back stays, practically increase the foundation area by one-half, and often more. This framework of bents, morticed levelers and bolted diagonals serves as a front stay. The length of the base of such frames is then fully twice the height.

The strength and stability, as well as the durability, of tipples, especially those with shaking screens, commonly known as 'jiggers,' are greatly reduced by the excessive strains to which they are subjected. The inertia of the heavy screen, together with its burden of mineral, acts through the supporting rods and the engine connections to the framework of the tipple. So severe are these strains that when in operation the whole construction, including the shaft top, is in a tremor, and it is not uncommon to see the engine actuating the screen move a fraction of an inch or more on its support at the reversal of the stroke. The strains then, to which a tipple, especially of the jigger form, are subjected are manifold, but fortunately they act along the line of its longer dimension and are consequently not so weakening as transverse strains would be.

With head-frames and tipples for inclined shafts or slopes, the line of track, extending from the shaft mouth to the elevating structure, which is supported on well morticed and braced bents, really forms the back stay for resisting the overturning tendency of hoisting. This form makes one of the strongest constructions possible, as the resultant of the forces acting through the hoisting rope, the pull of hoist and the resistance of the load. falls well within the base of the tipple. Then, too, as such constructions are usually built on sloping ground, the back stay tends toward perpendicularity rather than parallelism with the supporting surface. The construction is also low, which adds greatly to its stability and durability.

The types of head-frames to be seen in the Mississippi Valley may, for convenience, be grouped into the following classes: (1) four-post frames for small permanent and prospect shafts; (2) whims, or the Mexican *malacate;* (3) large frames for vertical shafts; (4) tipples for vertical shafts; and (5) slope tipples or tipples for incline shafts. Only the three last mentioned are of importance.

The four-post frames are commonly employed in metal and coal mines, but when employed in coal mining the shafts are small.

The head frames commonly employed in the lead and zinc mines of Kansas, Missouri, Illinois and Wisconsin are hardly more than four-post derricks provided with single or double swivel sheaves and are bucket rather than cage tops. These frames have the landing platform supported some 16 to 35 ft. above the ground on four posts, which are well braced by levelers and diagonals, and are, as a rule, given little or no batter. (See Fig. 1.) Mounted upon the platform, and extending 12 to 14 ft. above it, is the construction that supports the sheave or sheaves, which consists of four posts, all sloping inward, and held rigidly in place at the top by a horizontal frame, the whole forming a truncated pyramid. This top construction is also firmly braced by levelers

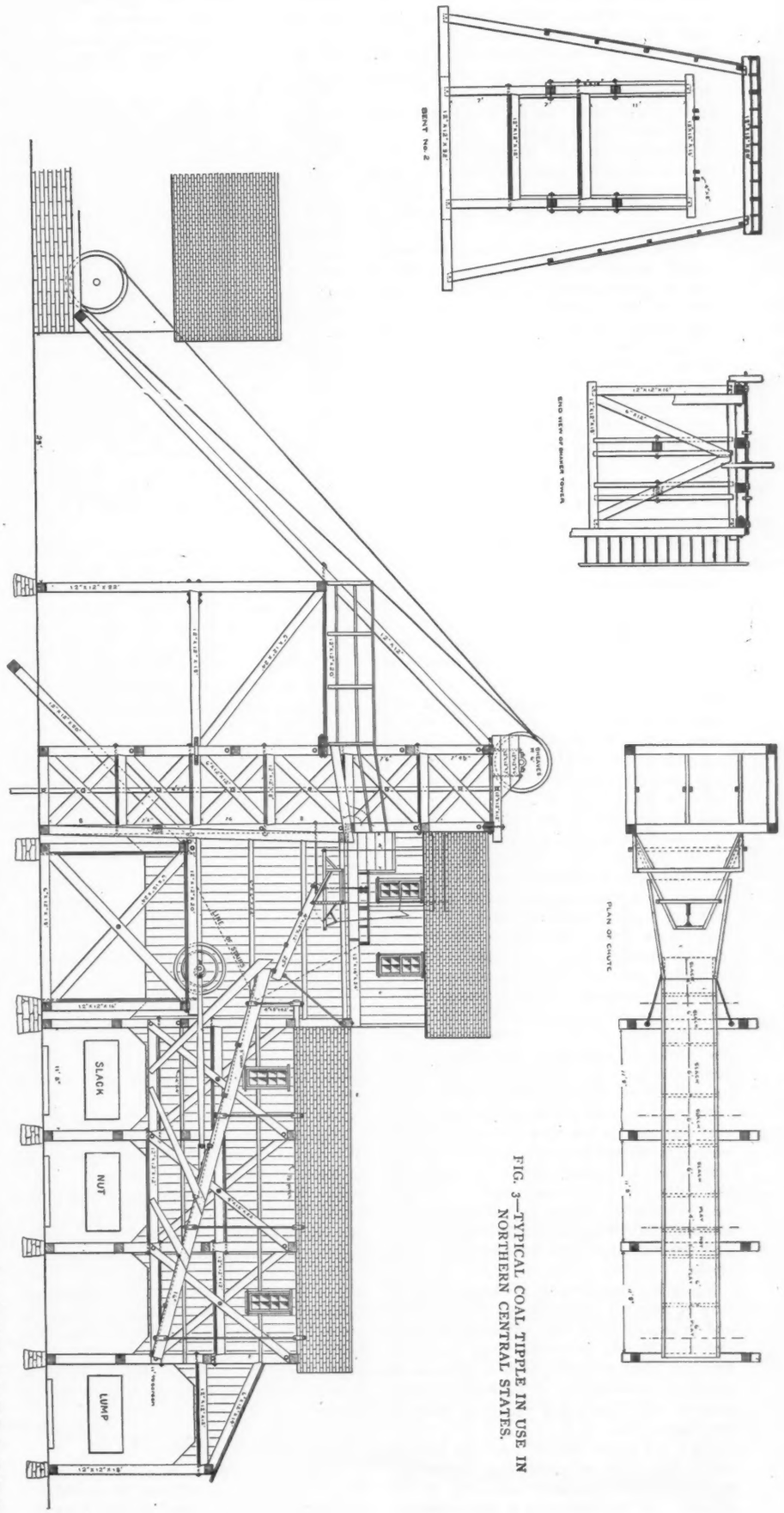


FIG. 3.—TYPICAL COAL TIPPLE IN USE IN NORTHERN CENTRAL STATES.

and diagonals, and bears cross timbers supporting the sheave; this form of head-frame may be called a bucket top, as it is used to hoist by bucket only. At coal shafts a similar construction is often employed, which becomes more pretentious as the size of the shaft increases, and may take on back stays when pony hoists are employed.

Whims of the *malacate* type are quite common in the earlier operations, especially along the outcrop, where the coal is close to the surface and the element of time in hoisting is negligible.

Large independent head-frames are exceptional, the maximum size being attained by the salt plants, where the head-frame is adjacent to, but practically independent of, the mill or tipple portion of the structure. Such a head-frame is shown in Fig. 2, which is part of the Royal Salt Company's plant at Kanopolis, Kan. This is one of the largest and best constructed head-frames in the Mississippi valley, and may be considered to be a four-post frame, although the front posts do not extend to the top nor bear sheaves. The triangle formed by the first bent, back stay and ground is a right-isosceles, which, together with the intermediate bents and transverse and longitudinal braces, form a structure, although nearly 100 ft. in height, apparently as strong and stable as when first built some 15 years ago. A peculiarity in the design of this head-frame is noticed in the construction of the batter-posts of the first bent, which are made up of four timbers each. These posts stand upon cast-iron plates or stools (24 in. square and 1.5 in. thick), which in turn cap a solid masonry wall and are leveled up and held in place by steel wedges and sulphur. (See Fig. 2.) The timbers that form the posts are spaced 4 in. apart and are held in their respective positions at the corners of the stools by blocks and by the ends of the braces of the bent. The second and third bents are made up of single timbers. The members of the back stay are three in number and consist of two timbers each, which are also spaced 4 in. apart and are securely bolted together and to the tops of the bents. The sheaves are mounted directly upon the posts of the first bent, so as to project over and above the centers of the shaft compartments. The enclosing framework of the compartments only needs then to be sufficiently strong to support and keep the guides in alignment. The batter of the bents is about 1 to 7 and the back stay makes an angle of 45° with the shaft timbers.

Fig. 3 is a form of tipple common to the coal-fields; it is arranged for automatically unloading the coal from cars and has a shaking screen, as is required by law in several of the States. It is a four-post frame. The back stay is braced by a back-knee arrangement of timbers; the front is braced both transversely and longitudinally by the battered bents of the tipple.

Fig. 4 is a typical tipple for large shafts; it may or may not be provided with a housing, and is usually fitted with automatic dumping devices. In this frame there are in reality two back stays extending parallel; this, or an equivalent construction, is considered necessary in high frames and especially those of the jigger type.

Fig. 5 is a typical side-hill tipple for inclined shafts, blue prints of which were kindly furnished the writer by the designer, Mr. W. H. Norman. It is distinctively a bent construction and resembles a four-track railroad trestle-work terminating in a double inclined track for the slope, which is elevated a few feet above the two tracks extending on either side; the former being the hoist and the latter the return tracks.

Similar tipples, but of the bridge type, are employed where slopes are operated on both sides of a gulch. The framework of the tipple then spans the gulch or ravine and supports two lines of track and the necessary cross-switches. The winding engine has two drums, one for each side; or probably a more common arrangement, when possible, is to employ an electric locomotive, which serves both or all of the slopes and works alternately between the two sides. The sized product is delivered to railroad cars that run under the tipple along the bed of the gulch. An excellent illustration of bridge tipple can be seen at Poteau, Indian Territory; the hauling being done by an electric locomotive.

In all the head-frames noted for vertical shafts, the attachment of the guides is easily accomplished, as the posts are vertical and without batter; the position of the sheaves is also simple and effective. As multiple deck cages are rare, no special provision is made for their use.

There is little to say regarding the durability of frames from the standpoint of decay and combustibility, as metal has not as yet entered into their construction here. A number of frames are destroyed by fire yearly, but there would be little advantage even if metal was used, because the wooden housing and large amount of combustible matter, as at coal mines, would expose any material to destruction.

The cost of head-frames varies according to the amount of material used in their construction, and, consequently, with the design. The total number of feet (board measure) of timber, cost of labor and total cost for the head-frame portion only of the various constructions are given herewith:

Cost of Head Frames.

Fig.	Name.	Feet B. M. of sizes over and including 12x12 in.	Feet B. M. of sizes under 12x12 in.	Total feet B. M.	Approx. cost of labor in $.	Approx. total cost of frame in $.	Height in feet.
1.	Small four-post frame	....	1,791	1,791	20	70	31.5
2.	Kanopolis head frame	784	25,686	26,470	250	750	96.5
3.	Coal tipple (North)	10,048	3,196	13,244	130	380	52.
4.	Coal tipple (South)	11,726	3,600	15,326	150	450	60.
5.	Slope tipple	288,864	93,998	382,862	300	3,000	31.

The low cost of timber given in one or two of the cases cited above is due to native timber being used, which was sawed in local mills not far distant.

The total cost of complete tipple, as shown in Fig. 3 and 4, ranges from $2,500 to $3,000. When fixed screens are employed, the total cost of tipple, including all materials and labor, is somewhat less than that for jigger tipples, owing to the fact that less strength and stability are required and, consequently, less timber; the cost then ranges from $1,800 to $2,500.

The accompanying drawings were made largely from my sketches and from blue-prints furnished by various companies; those to whom I am especially indebted are: the Wear Coal & Coke Company, the Godman Coal & Coke Company, the Great Western Coal & Coke Company and the Osage Coal & Mining Company.

NICKEL COINAGE IN INDIA.—The Indian government is considering the advisability of issuing a nickel currency to take the place of the smallest silver pieces. The new coins will represent a value of one *anna* (2 cents). At present no silver coins of less than two *annas* are issued.

REPUBLIC QUADRANGLE, WASHINGTON.—The United States Geological Survey has recently published a map of the Republic quadrangle, Washington, which covers an area of 790 square miles in Ferry and Okanogan counties. Its northern boundary is the international boundary line between the United States and Canada. The most notable feature of the map is the mountainous character of the topography. The largest of the very few towns in the area is Republic, which has had two railroads. One line connects it with Grand Forks by the Republic & Kettle River Railroad; the other road is a branch of the Spokane Falls & Northern Railroad. The main industry of this area is gold mining.

GEOLOGICAL SURVEY WORK IN IDAHO, MONTANA AND UTAH.—Under the direction of the United States Geological Survey the areal and economic survey of the Cœur d'Alene district, Idaho, with special reference to the ore deposits, will be completed by Dr. F. L. Ransome. Mr. F. C. Calkins will assist Dr. Ransome in this work. Mr. W. H. Weed will complete the preparation of a report on the Butte, Montana, district. Mr. J. M. Boutwell will complete an investigation of the mining geology of the Park City district, Utah. He will also make a reconnaissance of the areal, stratigraphic and structural geology of the western portion of the Uinta mountains. Mr. Lester H. Woolsey will assist him.

CALCINING TEMPERATURE OF PORTLAND CEMENT.—H. P. Bonde, of Copenhagen, in *Baumaterialienkunde*, April 15, 1904, calls attention to how little is said about the calcining temperature of cement even in books which give full attention to everything else. Bonde, using an electric sample kiln belonging to the government testing laboratory at Cophenhagen, made a series of tests using sample pieces made of raw cement meal with a little water. The pieces had about the shape of Seger cones, but were only half that size. The results obtained showed that the calcining temperature for normal Portland cement (75 to 76 per cent $CaCO_3$) and of slag cement is close to 1,400° C. A reduction of 3 per cent in carbonate of lime reduced the calcining temperature 50°. A change in the fineness of the ground raw materials gave no indication of requiring a different temperature. Trial of a rather abnormal mixture (only a trace of Fe_2O_3 and only 70 per cent $CaCO_3$) indicated that by comparison alumina seems a stronger flux than iron oxide. The author concludes that it is only through the contact with the acid fine clay that the strongly basic cement mixture can be fused at the temperatures which can be supposed to occur in a cement kiln in actual practice.

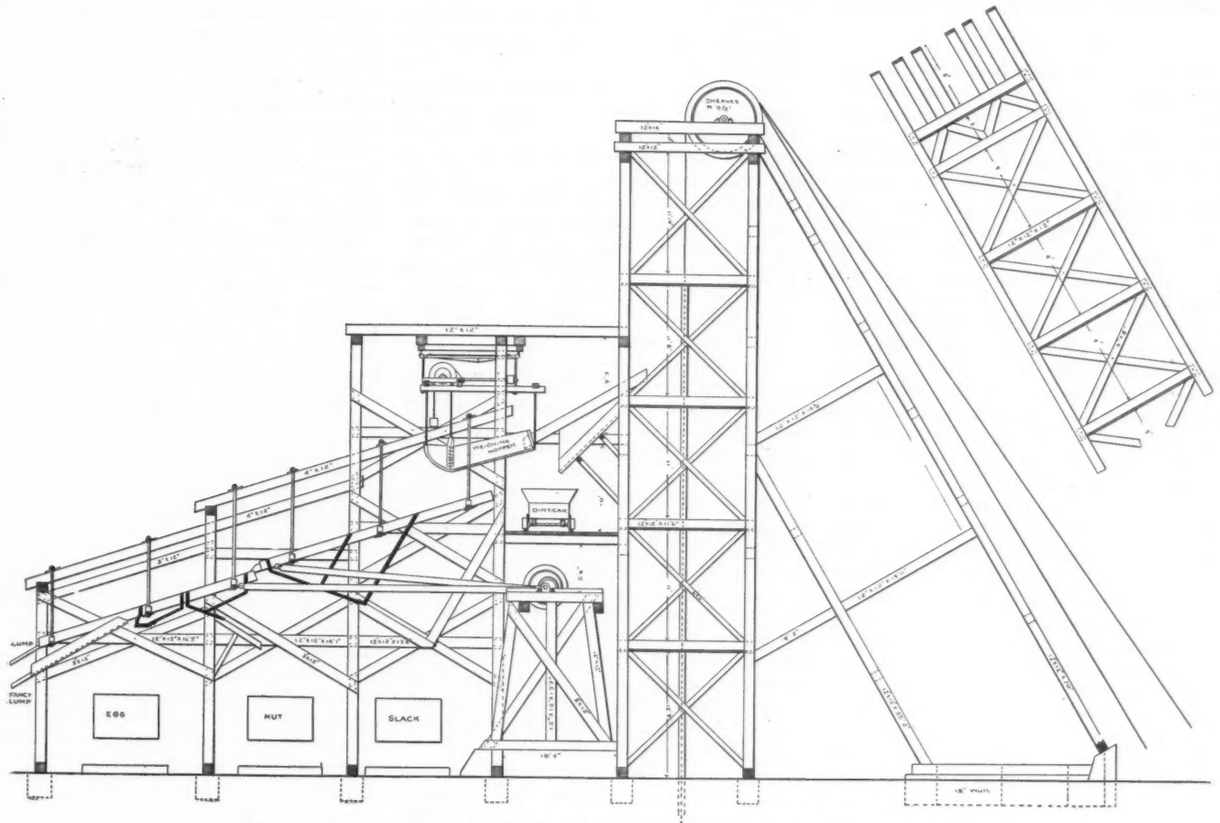


FIG. 4—TYPICAL FORM OF TIPPLE CONSTRUCTION USED IN SOUTH-CENTRAL STATES.

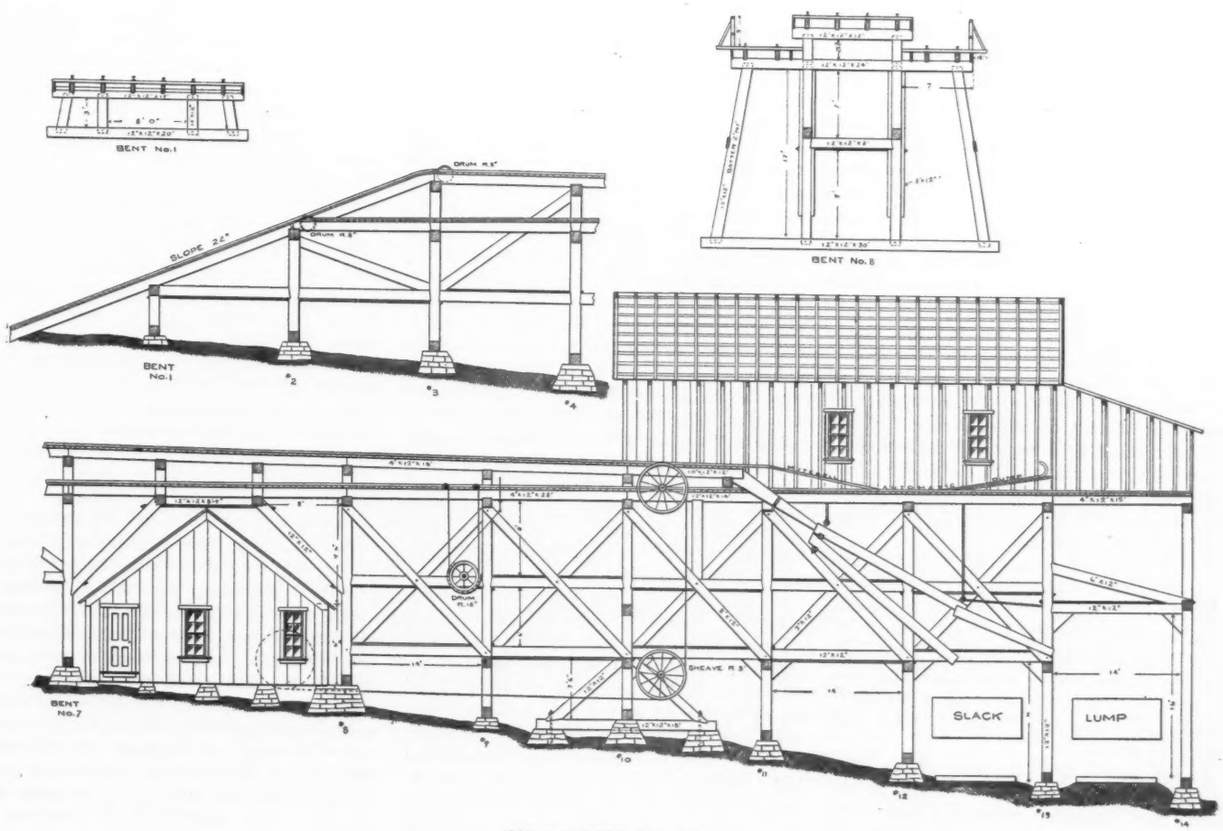


FIG. 5—SLOPE TIPPLE.

KEROSENE SHALE IN AUSTRALIA.

By JOHN PLUMMER.

The fact that Australia is declared by competent authorities to excel all other countries both in the number and extent of its kerosene shale deposits, naturally awakens some interest in their mode of occurrence, and the manner in which they are worked. The earliest reference to the existence of kerosene in the Commonwealth is believed to be contained in a work published in Paris in 1807, after the return of a French scientific expedition which visited Australia in 1802. Among the members of the party were MM. Baily and Dupich, who, during the stay of the expedition in New South Wales, made a journey of investigation to the base of the Blue Mountains, near the junction of the Grose and Hawkesbury rivers. Here the results of their researches enabled them to predict the existence of coal in the vicinity of Sydney. They also mentioned the discovery of "considerable masses of a bituminous schist," which burnt with "a lively flame," giving off a thick smoke and "an extremely pronounced odor of bitumen." The combustion, it was explained, did not cause the particles of the schist to lose in any degree the character which they originally had, but rendered them more friable, and deprived them of their color.

The New South Wales deposits are found principally along the shallow western edge of the coal-bearing area, the extreme north and south limit being about 260 miles, and the east and west about 90 miles. The widespread geographical distribution and comparative abundance of kerosene shale in New South Wales, is in striking contrast to its isolation and apparent rarity elsewhere, the solitary patches in Scotland and France constituting, so far as known, the only other noteworthy occurrences.

The deposits at present worked are situated at Hartley Vale, New Hartley, and Genowlan, in the Blue Mountain district, and at Joadja, in the Mittagong district, south of Sydney.

The main source of Australian kerosene shale supply comes from the Hartley and Capertree districts, where the mines at Hartley Vale, New Hartley, and Genowlan produced, in 1901, 54,363 tons, valued at £40,935. Hartley Vale, an immense depression almost surrounded by the Blue Mountains, is about 84 miles west of Sydney. The existence of kerosene shale appears to have been ascertained at an early date; in 1845 Count Strzelecki published a work on New South Wales and Tasmania, in which he alluded to the coal seams in the Hartley district as "overlying masses of pure bitumen." This was evidently the kerosene shale subsequently worked by the Kerosene Oil & Paraffin Company, Ltd., established in 1865, and the Western Kerosene Oil Company, Ltd., established during the following year.

For about thirty years from the commencement of operations at Hartley Vale, work was vigorously carried on, the first-grade mineral being exported, and the 'seconds' retorted locally, or at Botany, near Sydney. Although the deposit has become practically exhausted, it remains unrivaled as regards the combination of thickness of seam, richness, and extent of output.

At the present time the bulk of the New South Wales kerosene shale supply is obtained from Genowlan, sometimes referred to as Airly, after the mountain in which the deposits are found. Airly and Genowlan mountains consist of an isolated mass of Permo-Carboniferous strata, surmounted by escarpments of Triassic sandstone.

The existence of the deposit was indicated by loose blocks in Genowlan creek, which intersects the seam. In July, 1883, a couple of prospectors traced the blocks to their source, and secured a lease of the ground on which it was situated. The northern, or New Hartley, portion of the deposit has been leased to the New South Wales Shale & Oil Company; while the southern, or Genowlan, portion has been leased by the Australian Shale Syndicate to the Australian Kerosene Oil & Mineral Company.

In working the Genowlan and New Hartley deposits, the 'long-wall' system has been adopted. Explosives are unnecessary for breaking down the seam; on the contrary, great danger is experienced from the continuous cracking and 'shooting' of the shale as the roof settles on the face. Where lateral expansion is rendered possible by mine workings, the tension is so great that cracking and 'shooting' are almost continuous as the settling proceeds. Further release by holding is therefore attended with considerable risk to the miners, who are compelled to work behind breast-boards, and cover their eyes with wire-gauze guards as a protection against flying fragments. The tendency of kerosene shale to conchoidal fracturing under stress at right angles to the stratification increases the development of sharp edges, which cut like knives. Numerous accidents have resulted, some unfortunately attended with impairment of sight.

At Joadja the cost of mining has naturally varied with altering conditions, ranging from 3s. 9d. to 20s. per ton. These rates cover hewing and placing in trucks only. At the New Hartley mine, the cost of royalty, winning, and placing the shale on the railway trucks is estimated at 20s. 6d. per ton.

The products derivable from kerosene shale are proportional to, and depend upon, the temperature employed in the distillation and refining. The range of combination, dissociation, and re-combination of hydro-carbon molecules under fractional distillation is exceedingly wide and complex, from heavy lubricating greases and solid paraffins, through various machine and burn-oils of gradually lessening gravity, to volatile naphthaline, gasoline, and permanent gases. The present system of extracting the oil is greatly superior to that adopted during the earlier years of the industry. The first retort tried at Hartley Vale by the Hartley Kerosene Oil & Paraffin Company, Ltd., was of circular form, and fitted with trays on which the crushed mineral was placed in a kind of muffle furnace, the firing and condensation being after the usual manner of such operations. The oil thus obtained was sent to Botany, near Sydney. Subsequently, a retort on the principle of the lime kiln was constructed.

In 1868 the Western Kerosene Oil Company, Ltd., opened a retorting plant and refinery at Botany for the treatment of Hartley Vale shale, the retorts being like ordinary gas retorts, having a capacity of 5 cwt. each, and set up in bunches of five. These being found expensive, a retort on the muffle principle, with cast-iron mouthpieces and wrought-iron body, and capable of holding 25 cwt., was invented by Mr. Glover, engineer to the company, and tried with such success that it was adopted. In 1880, retorts and a refinery were established at Hartley Vale. Previously, the retorting process was confined exclusively to the richer portions of shale, the 'seconds' or 'bottoms' being either left in the mine or rejected at the surface. Trials of these having proved successful, it was decided to establish retorting works near the mine, and thus save the cost of transport to Sydney, the richer shale continuing to be treated as before at Botany.

In consequence of the amount of 'ironstone band' (ordinary black cannel coal) occurring in the seam, especially in rolls or undulations, attention was directed to the possibility of turning it to profitable account. As the wrought-iron body of the muffle retorts would not stand the heat necessary to convert the refractory shales into oils, the manager, Mr. W. J. Hall, assisted by Mr. J. Palmer, now manager of the Torbane retorts, of which mention will be made later on, designed and constructed a vertical retort, the success of which led to the erection of 15 similar retorts, in which the accumulated stock of inferior mineral was used up.

The area of retorting shale at Hartley Vale having diminished, and the cost of extraction increasing, the New South Wales Shale & Oil Company directed its attention in 1896 to the 'seconds' in the New Hartley section of the Genowlan seam, which they had acquired under royalty. Mr. Hale, having, by personal inspection, ascertained that the retorts employed in Scotland were unsuitable for Australian use, decided to recommend a special form, which proved successful; this retort was based on the fact that the New Hartley shale required lengthened exposure to heat, and, consequently, slower distillation. To secure this result, in designing the height was nearly doubled, while the diameter was reduced.

At Torbane, on the western side of Mount Genowlan, 40 retorts have been erected, each 42 ft. 6 in. high, with a diam. of 4 ft. 6 in. by 2 ft. 6 in., the holding capacity being about 14 tons. Each retort is capable of treating about 3 tons daily, as against 2.5 tons weekly in the old horizontal retorts. The object of the increased height is to secure the maximum yield of ammoniacal liquor; tests of the New Hartley shale having proved it richer in nitrogen than that from Hartley Vale. The Torbane retorts are run exclusively for the production of crude oil, which is dispatched by rail to Hartley Vale, a distance of 43 miles, for fractional distillation. The average yield of crude oil is reported to equal 52 gal. per ton from inferior shale, 'bottoms' and 'cuttings' or 'dressings' from export shale. The inferior portion of the seam, or that containing no marketable shale, is estimated to yield, from floor to roof, an average of 40 to 60 gal. of crude oil per ton.

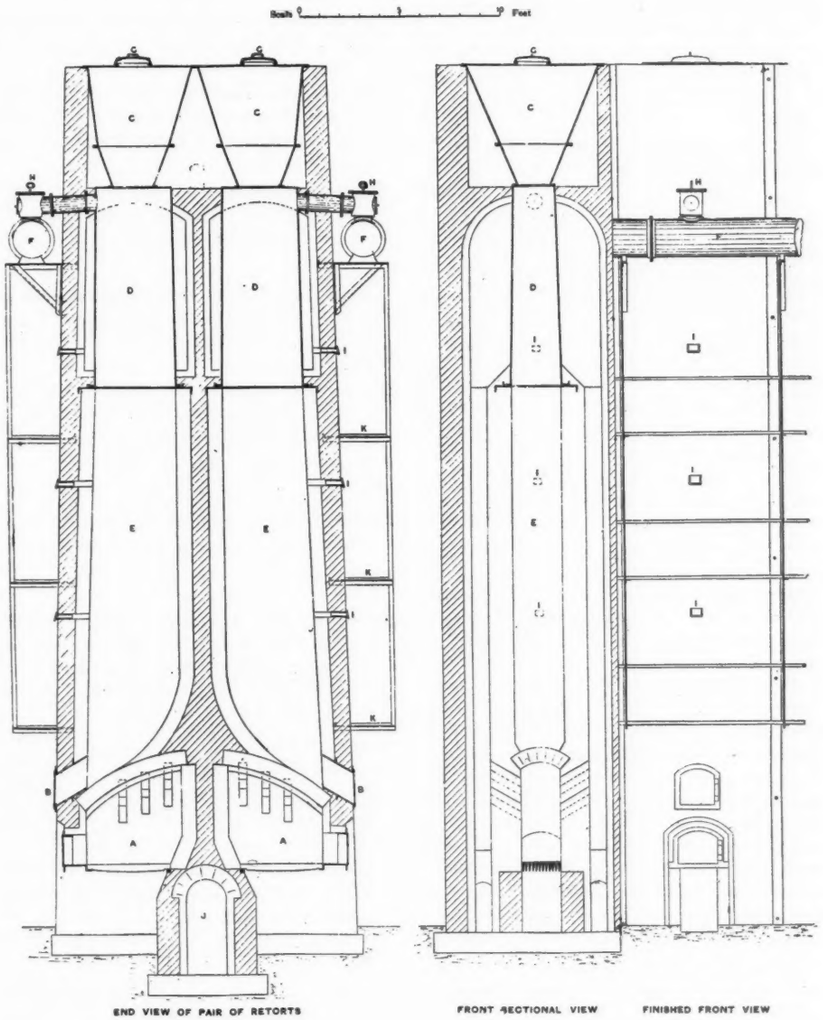
The gases generated in the retorts are drawn over by a Baker's exhauster, passing in their transit through a series of pipes forming a vertical condenser, and thence through a couple of towers, in one of which the ascending gases meet a spray of water descending, and in the other a spray of oil of 0.860 gravity. In the first tower, the water-spray absorbs any free ammonia coming over with the uncondensed gases; the oil-spray in the second tower absorbing the lighter volatile hydrocarbons. As the oil in use increases in gravity, it is subjected at intervals to steam distillation. The crude oil is conveyed in

traveling tanks holding about 8,000 gal. each to a railway siding about 2 miles distant, thence to Hartley Vale siding, where it is discharged into smaller tanks, holding 350 gal. each, by gravity in summer, and by pumping in winter. It is then drawn by engine to the top of the incline, whence it descends by cable into the valley, and then again by engine to the refinery, some 2.5 miles distant from the railway.

At the refinery the crude oil is thrown into vertical washers, where it receives a slight treatment with caustic soda. From the washers the oil passes over to horizontal stills for distillation, where it is fractioned, the lighter cuts being sent to Sydney for the enrichment of water-gas. The stills are run until a gravity of 0.890 is reached, the residues being thrown over to coking mills and run to dryness, a coke being produced. The heavy oils, or residues from the lighter cuts, are refrigerated, and forced through filter-presses. The filtered oil (blue oil) is again distilled, the heavier portion being frozen and pressed as before, the residue being forwarded to the Sydney works of the company for manufacture into anti-friction grease.

The paraffin left in the filter-presses is melted down and thrown into steam 'sweating' rooms, in which it yields up the oil remaining in suspension. It is then thrown over into the refining room, where it receives a treatment of naphtha, is pressed in hydraulic presses—two tons per square inch—and treated with animal charcoal and imported decolorizing clay. After an application of steam to drive off the remaining naphtha, the paraffin is again passed through filters, after which it is ready for candle-making. According to Hartley Vale experience, one hundred parts of crude oil will yield the following products: Naphtha, 3 per cent; gas oils, 65 per cent; blue oils, 10 per cent; paraffin, 8 per cent; tar and gaseous loss, 14 per cent. The tars, when required, are converted into pitch, and sold to the smelting works at Cockle creek, Lake Macquarie, for briquetting New Caledonia chrome fines and slimes. When not so required, they are burned in a small furnace.

Before retorting was relinquished at Hartley Vale, a plant for obtaining ammonium sulphate was installed, and several tons of the product secured from the inferior shale. At Torbane, where the inferior shale is being retorted, ammonia is being recovered as a commercial product in the form of either concentrated ammonia liquor or sulphate, the plant being similar to those used in gas-works. The concentrated liquor is forwarded in drums, containing 80 gal. each, to the works of the Ammonia Company of Australia, at Clyde, near Sydney, where it is converted into anhydrous ammonia. In future it will be brought to Clyde in a railway traveling tank having a capacity of 9 tons.



A. Furnace. B. Discharging door. C. Hopper. D. Iron retort. E. Brick retort. F. Gas main. G. Cover to charging door. H. Stop valve. I. Spy holes. J. Flue to stack. K. Platform.

VERTICAL SHALE RETORT AT TORBANE, N. S. W.

Some difficulty is experienced in estimating the total production of kerosene shale in New South Wales to the end of 1901, by reason of the absence of statistics during the earlier years of production, but so far as can be ascertained the total output was 1,073,468 tons, representing a value of £1,970,623, or an average of £1, 16s. 8.58d. per ton.

Kerosene shale is believed to exist in Western Australia, but few, if any, traces of its presence have been found in the other shales, notwithstanding several reported discoveries. Mr. E. J. Nankivell, on May 29, writing to the *Australian Mining Standard*, says: "In the southwest coast of Australia there is a large tract of heavily-timbered karri and jarrah country. It is practically unpopulated. Roads lead from Bridgetown and Besselton to portions of the coast. For many years it has been noticed that after a heavy northwest storm large quantities of bitumen, in pieces upward of 400 lb. in weight, still viscid and ragged, as if recently torn from the fissure from which it exuded, have been cast up on the beach some forty chains west of the Warren river. On the sea at this place there is a thick seam of reddish brown hue, which, as the sun shines on it, gives forth a most beautiful array of prismatic colors. Analysis proves this to be petroleum. The bitumen is of high specific gravity and exceptionally pure. It contains 95.2 per cent of bitumen matter. A similar scum occurs for many miles along the beach, but in no place is it so thick and luminous as at the spot mentioned. Elsewhere bitumen is also cast up, but in pieces not larger than one's two hands. Shales taken from the bed of the Warren river, five miles inland, contain 7.2 gal. per ton, and sand rocks all have a trace of petroleum. The surface of the river is coated with a film of light oil. Where the water is impeded, it collects readily in company with vegetable matter. It can be captured in sufficient quantity to prove that it also contains an appreciable quantity of the heavier forms of oils. From the bed of the Warren river oil and borehole gas is constantly ejected." From these and other remarks it would appear that considerable possibilities exist with respect to discoveries of bituminous deposits in Western Australia.

A SWEDISH IRON ORE CONTRACT.—It is reported that four of the largest iron producers in Germany, including the Gutehoffenung, Deutscher Kaiser, Rheinische and Krupp companies, have entered into a contract with a Swedish mining concern for the delivery of 14,000,000 tons of iron ore. The shipments are to be made via Emden and Holland ports. The ore will be mined from the deposits of Grängesberg, Gellivara and Kiirunavaara, which are owned by the 'Trafaktiebolaget Grängesberg Oexelösun.' The prices fixed by agreement are said to be from 1 to 1.5 marks higher than those obtaining in previous contracts.

FATAL ACCIDENTS IN MINES.

BY AN OCCASIONAL CORRESPONDENT.

A Blue Book entitled 'Mines and Quarries, General Report and Statistics for 1902, Part IV, Foreign and Colonial,' has recently been published, and was the last work that the late Sir Clement Le Neve Foster was engaged upon; from it the following figures have been obtained. South America gave no statistics respecting the accident rate, and but little as to the quantities and values of mineral raised. The United States gave full particulars respecting the coal mines, while the metalliferous mines gave but little information; the Michigan copper mines show a death rate of 3.11 per 1,000 employees, Colorado for five years not less than 3.274, Montana 3.41, Missouri 1.23.

The fatal accidents in mines ranged from less than 0.5 to over 4 per thousand. The mines in Great Britain and Ireland show a decrease of 0.13, while the quarries show an increase of 0.19 over 1901. France shows a decrease of 0.71 in her mines, and an increase of 0.15 in her quarries.

At the collieries the total death rate was 4.612 as against 4.548 in 1901, the ratio being 1.93 and 1.91 respectively. For the British Empire these figures were 1.46 and 1.45 per thousand. Germany gives the causes of the 8.143 accidents during the years as follows: Owing to danger inherent to the work itself, 63.64 per cent; defects in the working, 0.56 per cent; fault of fellow workmen, 3.86 per cent; fault of injured persons, 31.94; total, 100.

The Australian States all furnished statistics save South Australia.

Colony.	Deaths. 1901.	Death rate. 1901.	Deaths. 1902.	Death rate. 1902.
New South Wales..	55	1.50	124	3.68
Queensland	21	1.57	17	1.31
Tasmania	7	1.01	5	0.84
Victoria	32	1.12	34	1.24
West Australia....	45	2.52	39	2.10
Total	160	1.45	219	2.07

New South Wales shows a big increase on account of one big fatality in 1902. Lead poisoning in the Broken Hill mines increased to an alarming extent in 1902, after a steady decrease for five years. British Columbia's death rate in the collieries increased from 25.67 to 34.65, which latter figure eclipses the death rate of the 'shunters' employed on the British railways, whose accident rate last year was 30.59 per 1,000 employed; the navvies accident rate was 99 out of a total of 66,000, or 1.50 per 1,000.

Mr. Martin's report for 1902 shows for the Southern Division of England (which includes Cornwall, Devon, Dorset, Gloucester, Somerset, Surrey, etc.), the following results:

	Persons employed.	Rate per 1,000.
Coal mines	50.244	1.41
Metalliferous	8.374	1.20
Quarries	16.995	0.94

The number of tons of coal broken per man employed below and above ground was 251 in 1901, and 254 in 1902, long tons, as compared with the 604 and 582 short tons broken per man in the United States.

PRODUCTION OF CALCIUM CARBIDE.—A foreign contemporary estimates the present world's production of calcium carbide at 88,000 metric tons annually, and the consumption at 86,000 tons. The chief producing countries with the output of each in metric tons are as follows: Germany and Switzerland, 12,000; Italy, 12,000; Canada, 18,000; France, 15,000; Sweden, 6,000; Spain, 5,000; Norway, 5,000; Austria, 3,000, and England, 1,000 tons.

RECENT LITERATURE OF ECONOMIC GEOLOGY.—XXI. LEAD AND ZINC.

BY H. FOSTER BAIN.

Progress of the Zinc Industry in Missouri in 1903. By Frank Nicholson. ENGINEERING AND MINING JOURNAL, January 14, 1904, pp. 80-81.

Statistical résumé with notes on recent development and estimates of cost of production.

Joplin Zinc Deposits. By Joe Plym. *Mines and Minerals.* February, 1904, pp. 329-330.

Discusses the leasing system, the mining and milling methods of the district and gives interesting figures of cost of production.

Cost of Mining Zinc Ore in the Joplin District. By W. S. Hutchinson. ENGINEERING AND MINING JOURNAL, February 25, 1904, pp. 312-314.

Gives interesting and valuable figures of costs and convenient analytical tables.

Lead and Zinc Deposits of the Joplin District. By W. S. Tangier-Smith. *Bulletin* 213, United States Geological Survey, pp. 197-204.

The general stratigraphy and structure of this district are briefly described and the distribution and form of the ore bodies discussed with brief notes on the genesis of the ores. The ore bodies occur in Lower Carboniferous, non-magnesian, cherty limestones which have a thickness of about 350 ft. and a low dip to the northwest. Faulting, while slight in amount, has importantly influenced the distribution of the ores. Deformation has been accompanied by slight folding and considerable brecciation of the country rock. Galena occurs most abundantly above water-level, and blende below. In form the ore deposits are horizontal, linear (runs), circular or elliptical and irregular. The form is believed to have been determined in part by the fracturing of the rock and secondarily by the action of underground water in dissolving the limestone. Three main belts of ore deposits are discriminated: (1) The Joplin, including the mines immediately around that place and northwest to Tuckahoe, with outlying mines at Shoal creek and Carl Junction; (2) the Galena; (3) the Webb City, extending from Oronogo to Duenweg. The position of these belts is believed to have been determined by structural disturbances. The deposits are believed to represent segregation from the country rock made by the ordinary underground waters of the region.

Richardson's Zinc Mine. By W. E. H. Carter. *Report,* Bureau of Mines (Ontario), 1903, p. 139.

A vertical vein traversing limestone has been developed to a depth of 80 ft., 900 tons of ore running 46 per cent zinc and a minor amount of galena have been raised. The mine is eight miles west of Parham, in Oldew township, and is at present the only producing zinc mine in Ontario.

Zinc and Lead Deposits of Northern Arkansas. By George I. Adams. *Bulletin* 213, United States Geological Survey, pp. 187-196.

A brief résumé of the geology of the region accompanied by a general discussion of the ore deposits. The ores occur mainly in certain Ordovician dolomites, and subordinately in Carboniferous limestones of the same age as the country rock at Joplin. The position of the ore bodies has been determined by fractures in the rocks. They are believd to represent concentrations by underground water of material originally widely disseminated through the limestones. As to prospective development, the author says: "While it is impossible to predict with certainty the future of the field, there are mines now opened which are capable of large output, and many prospects are promising and warrant fuller exploitation. With the completion of the railroads the northern Arkansas district promises to assume its true commercial importance."

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in a subsequent issue of this JOURNAL.

Great Britain. Mines and Quarries Report for 1903. Part I. District Statistics. London; H. M. Stationery Office. Pages, 48, with map.

West Australian Mining and Metallurgy. By Donald Clark. Kalgoorlie, Melbourne and Sydney; Critchley Parker. Pages, 204; illustrated.

Annual Report of the City Engineer of Providence, 1903. Otis F. Clapp, Engineer. Providence, R. I.; published by the City. Pages, 80; illustrated.

Queensland, Annual Report on Mines, 1903. A. R. Macdonald, Under Secretary for Mines. Brisbane, Queensland; Government Printer. Pages, 184; illustrated.

Traité General de l'Emploi de l'Electricité dans l'Industrie Minière. By N. Lapostolest. Paris, France; Veuve Ch. Dunod. Pages, 296; illustrated. Price (in New York), $2.50.

Mining Operations in the Province of Quebec for the Year 1903. By J. Obalski, Inspector of Mines. Quebec, P. Q.; published by the Department of Lands, Mines and Fisheries. Pages, 88.

Annual Report of the Department of Mines of New South Wales for 1903. E. F. Pittman, Under Secretary for Mines. Sydney, N. S. W.; Government Printer. Pages, 152; illustrated.

Geologic Atlas of the United States. No. 107. Newcastle Folio, Wyoming—South Dakota. Washington; Engraved and Printed by the Geological Survey. Seven plates and 10 pages text.

World's Fair Souvenir of the Engineers' Club of St. Louis. Prepared by H. A. Wheeler and J. A. Ockerson, Committee. St. Louis; published by the Engineers' Club. Pages, 184; illustrated.

Statistique des Industries Extractives et Metallurgiques en Belgique. 1902. Prepared by Louis Dejardin for the Ministry of Industry and Labor. Brussels, Belgium; L. Narcisse. Pages, 80.

Moody's Manual of Corporation Securities. Fifth Year. 1904. Edited by John Moody. New York; the Moody Publishing Company. Pages, 2372; with maps. Price, bound in cloth, $10; flexible leather, $12.

New South Wales Statistical Register. 1903. *Part I. Public Finance. Part II. Local Government.* Compiled by T. A. Coghlan, Government Statistician. Sydney, N. S. W.; Government Printer. Pages 60 and 64.

The Commerce and Navigation of the United States for the Year Ending June 30, 1903. Volume 2. Prepared in the Bureau of Statistics; O. P. Austin, Chief. Washington; Government Printing Office. Pages, 852.

BOOKS REVIEWED.

The Colliery Manager's Pocket Book, Almanac and Diary for 1904. Edited by R. A. S. Redmayne. London, England; published by the Colliery Guardian Company, Ltd.

This is the thirty-fifth publication of this annual, a sufficient proof of its merits. It contains dated pages for a diary, blank pages for a cash account, and a lot of miscellaneous information of interest to English colliery managers, such as profits on coal mining, examination papers for different certificates in various districts, strength of materials, tables relating to boilers and to steam, gas and oil engines and electrical machinery, notes on ventilation, surveying valuation of coal lands, explosives, etc. The book has a good index.

Smelter and Mill Methods of Analysis in Use in the West. By Philip H. Argall. Boulder, Colo.; published by the University of Colorado. Pages, 57. Price, 50 cents.

This paper, issued as a regular number of the 'University of Colorado Studies,' describes the chemical methods employed in the milling and smelting plants of the West. It presents in a clear and succinct manner the various steps in the analytical determinations of ores and metallurgical products according to present accepted standards, with all supplementary details requisite to their application in practice. The first chapter of the paper deals with the subject of lead smelting. Under this head are discussed the character and preparation of the standard solutions required in the laboratory, the analysis of slag and fuel, and the determinations usually made on lead ores, dross and speiss. The subject of copper smelting is treated in a similar manner. The cyanide process, naturally, calls for an extended discussion, and it is handled in a very satisfactory way. The paper shows evidence of careful preparation and a breadth of view which reflect the highest credit upon its author.

Geological Survey of New Jersey. Annual Report for 1903. Henry B. Kümmel, State Geologist. Trenton, N. J.; State Printers. Pages, 168; illustrated.

This volume includes the administrative statement, showing the work done by the Survey during the year. Some work was done in the completion of the topographic surveys, and on the surface geology of the State; on its clay resources and glass-sands; and on the paleontology. The work on drainage and study of the water resources was continued. The last-named subject is one of great importance in a region so thickly populated and having so many towns and cities as New Jersey.

Besides this report, which occupies about a quarter of the book, there are papers on the 'Proposed Tide Waterway between Bay Head and Manasquan Inlet,' by C. C. Vermeule; 'Passaic Floods and their Control,' by C. C. Vermeule; 'Forest Fires in 1903,' by F. R. Meier; 'Underground Waters of New Jersey,' by G. N. Knapp; and, finally, a summary of the mineral production of the State, by S. H. Hamilton.

The Survey has now in preparation two valuable reports, one on the 'Surface Geology of South Jersey,' and the other on 'Clays.' Both of these are now nearly ready for publication.

World's Fair Souvenirs of the Engineers' Club of St. Louis. 1904. Prepared by a Special Committee. St. Louis; published by the Club. Pages, 180; illustrated.

At the time of the World's Fair in Chicago, 1893, the Engineers' Club of St. Louis prepared a pamphlet entitled 'Engineering Works of St. Louis and Its Vicinity, of Interest to Visiting Civil, Mining, Mechanical and Electrical Engineers.' This was intended to be of use to visiting engineers who might come to St. Louis during the Exposition. In the same year the Engineers' Club published a book of local engineering data for St. Louis, intended for the benefit of its members. This work was a record of available engineering data peculiar to the city and its environs. In this year of the Louisiana Purchase Exposition, the Club issues this book for the benefit of its members and of the large number of engineers who are expected to visit St. Louis. The book is to cover the ground of the two publications above mentioned, with the addition of a section devoted to the Louisiana Purchase Exposition, and a section for the Engineers' Club of St. Louis.

The book is handsomely printed and illustrated, and contains many data which are of interest to engineers who visit St. Louis and the Exposition. They will fully appreciate the enterprise of the Club in preparing this souvenir, as well as its courtesy to visitors, and its cordial recognition of the brotherhood of the profession everywhere.

Briquettes and Patent Fuel. Their Manufacture and Machinery Connected Therewith. By Philip R. Björling. London, England; Ribman, Limited. Pages, 256; illustrated. Price, $3.75.

The author of this book wrote a long article on briquette making for Volume VI, 1897, of *The Mineral Industry* and a series of articles for the *Colliery Guardian*. The present volume is a combination of these articles, with numerous additions to the text and illustrations intended to bring the matter up to date. The author has also added a chapter on all the different classes of bond or binding materials that have been patented as a guide for inventors. This chapter takes 92 pages, but its value to the average reader, if not to inventors, might have been greater were the dates given of the various patents mentioned. The chapter on presses takes 80 pages, and describes briefly all the important forms used in England and on the continent. The chapter on dryers covers 20 pages, and gives a brief summary of methods used at different works. Some notes on costs, statistics of production and fuel value of coal briquettes conclude the work.

Taken as a whole, the book shows a certain lack of proportion in the brief mention given some matters, such as the all important one of cost of production, but it is undeniably of value. In view of the increasing interest in the manufacture of briquettes in England and in this country, the book is at least timely. There can be no question but that the fuel briquette industry in this country is destined to be of importance. At present practically confined to California it will be taken up not only at points in the West, to increase the market value of lignites which slake on exposure and will not stand transportation, but also in the East in the anthracite region. Any one interested in the possibilities of the subject will find much information as to machinery and bonds in Mr. Björling's book.

Radio-Activity. By E. Rutherford, Cambridge, England; the University Press. New York; the Macmillan Company. Pages, 408; illustrated. Price, $3.50 net.

The discovery of radium and of the radio-active properties of matter is so recent, that most of the literature on the subject is scattered through technical journals and proceedings of scientific societies, and is difficult of access to the student. In this volume our existing knowledge of the still somewhat obscure phenomena which we class under the head of radio-activity is summed up and brought into connected form. It is not a mere compilation, for Dr. Rutherford—who is professor of physics at McGill University in Montreal—has been an active co-operator in the investigations which have followed the first discoveries of M. Becquerel and of Professor and Madame Curie; and he has contributed much that is of value to the discussion. It is partly due to his scientific work that our knowledge has made such rapid advance.

Dr. Rutherford divides his subject into eleven heads, which are, in their order as given, Radio-active Substances; the Ionization Theory of Gases; Methods of Measurement; Nature of the Radiations; Rate of Emission of Energy; Properties of the Radiations; Continuous Production of Radio-active Matter; Radio-active Emanations; Excited Radio-activity; Radio-active Processes; and, finally, Radio-activity of the Atmosphere and of Ordinary Materials.

The author says that the phenomena exhibited by the radio-active bodies are extremely complicated, and some form of theory is essential in order to connect, in an intelligible manner, the mass of experimental facts accumulated. The theory that the atoms of the radio-active bodies are undergoing spontaneous disintegration has been found serviceable, not only in correlating known phenomena, but also in suggesting new lines of research. In this book, the interpretation of the results has been, to a large extent, based on the disintegration theory. The rapid advance of our knowledge of radio-activity has been dependent on the information already gained by research into the electric properties of gases. It has, therefore, been thought best to include a brief account of those properties, to the extent that is necessary for the interpretation of the results of measurements in radio-activity by the electric method.

The book is a clear and compact statement of present knowledge on a subject which is of great importance in relation to all future study in chemistry and physics. While it naturally assumes some knowledge of chemistry in the reader, it is not unnecessarily abstruse, and any intelligent person can obtain from it a clear idea of what radio-activity is, and what its discovery may lead to in the future.

Petroleum has been discovered in West Africa. The concession covering the discovery is controlled by a German company.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
Letters should be addressed to the Editor.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Changes at St. John del Rey.

Sir.—It is of interest to mining men everywhere to see progress in one of the oldest gold mines in South America. The mine to which I refer is the Morro Velho, in Brazil, operated by the St. John del Rey Mining Company. The company announces in London the issue of new capital in the shape of £100,000 in 10 per cent preference shares. The chief purpose for which this extra capital is required is the completion of the electrical transmission plant, to bring power from a waterfall to the mine. The cost of steam power has always been a serious item of expenditure and the provision of electrical power, which, it is estimated, will cost only one-tenth of the steam power, is a decidedly prudent step. This company is one of the oldest mining companies in London. It was established so far back as 1830, and its history has been varied; at one time it paid handsome dividends, and at others natural obstacles had to be overcome. For instance, in 1888 the lode was entirely lost, owing to the collapse of the workings. Dividends were resumed in 1897, but owing to the comparatively low grade of the ore now worked, and the high capitalization of the company, the rate of dividend has been small, ranging from 5 to 10 per cent per annum. The average grade of the ore is about $10 per ton. The capital of the company is £546,000 in common stock, and £117,000 in 7 per cent debenture bonds. Strenuous efforts have been made during the last three or four years to provide the necessary capital for extensions of plant and for the electric transmission plant entirely out of revenue, but as the interest had to be paid on the bonds and common stockholders insisted on something in the way of a dividend, it was impossible to manage the finances of the company in the most approved method. In addition, many of the bondholders expressed their intention of not renewing their bonds, so that money had to be provided to redeem them. Circumstances, in connection with the desires of shareholders, therefore, made it necessary to issue new capital instead of paying for everything out of revenue.

There is, however, another fact concerning this issue which seems odd. The company has a reserve fund amounting to £80,000, all invested in high-class securities, yielding about 5 per cent per annum. Why should not this money be used for the provision of new plant instead of issuing preference shares? As it is, the company is borrowing at 10 per cent, and lending at 5 per cent. This does not appear to be wise finance.

London, June 24. BRAZILIAN.

GERMAN COKE PRICES.—The Coke Syndicate has announced the prices fixed for coke, in the second half of 1904, in the Saarbruck district. These prices are as follows, reduced to United States currency: Large coke, $4.66; medium, 50 to 80 mm. screen, $4.66; broken coke, 35 to 50 mm., $4.66; broken coke, 15 to 35 mm., $2.52; pea-coke, 8 to 15 mm. screen, $1.81 per metric ton. Large coke is advanced 23.8c. per ton.

ABSTRACTS OF OFFICIAL REPORTS.

Mount Lyell Mining & Railway Company, Ltd.

This company owns a large copper property in Tasmania. Its report covers the period ending March 31, 1904, as explained below. The earnings and expenses for the period were as follows:

Copper account	£346,369
Railroad earnings	19,183
Total earnings	£365,552
Mining charges	£47,867
Removing overburden	13,966
Smelting and converting	117,452
Freight and charges on copper	29,636
Railway expenses	13,577
General expenses	18,261
Mine prospecting	13,843
Total expenses	£254,602
Net balance	£110,950

The directors' report says, in substance: "The report deals with a period of some 7½ months, from the inception of the company until March 31, 1904. The company was incorporated on August 11, 1903, as a result of a scheme of amalgamation between the former Mount Lyell Mining & Railway Company, Ltd., and The North Mount Lyell Copper Company, Ltd. The scheme provided that, save as mentioned hereunder, the Mount Lyell and the North Mount Lyell Companies should sell to the present company all their undertakings and assets, and that, in consideration for such sales, there were to be issued to each company 600,000 fully paid-up shares, and in addition the North Mount Lyell Company was to receive £140,000 in 5 per cent debentures of the new company. It was further provided that the new company should pay to each of the former companies, or permit them to retain out of their assets, the sum of £15,000 to provide for commissions, compensations and allowances incurred in respect of, or consequent upon, the amalgamation. In addition the Mount Lyell old company was entitled to retain out of its assets the sum of £68,750, which was distributed as dividends amongst the shareholders of that company. With the exception of one or two small adjustments yet to be made, the amalgamation has been carried out. Your directors have had the whole of the company's plant, buildings, rolling stock and coke works revalued.

"The whole of the ore won from the North Mount Lyell mine is now smelted at the company's reduction works at Queenstown, and all supplies for that mine are carried by the Mount Lyell Railway.

"Operations at the company's mines have been vigorously carried on during the period under review, resulting in an output of 186,214 tons won from the Mount Lyell, and 54,846 tons from the North Mount Lyell properties, together with 10 tons of copper precipitates from the mine water. In addition to the above, 5,182 tons have been extracted from the Royal and South Tharsis properties. Owing to the silicious nature of the North Mount Lyell ore it is at present unnecessary to continue operations in the Royal and South Tharsis flux mines, which hitherto have supplied metal-bearing flux for smelting purposes. The North Mount Lyell mine is now in excellent condition, and operations have been greatly facilitated and cheapened. The sinking of the main shaft from the 200-ft. level has proved of the greatest advantage.

"The quantity of blister copper produced during the period was 5,005 tons, containing 4,944 tons of copper, 510,906 ounces of silver, and 13,139 ounces of gold. The period under review has been characterized by gratifying reductions in the cost of producing blister copper, due primarily to the elimination of the use of barren silicious fluxes owing to the complementary fluxing nature of the ores from the two principal mines. The reduced cost also bears testimony to the skill which is brought to bear upon the work by the company's officers."

The costs show a marked falling off in comparison with the best results obtained by the former Mount Lyell Company, and are as follows, per ton of ore; the figures being reduced to United States currency:

Mining, including removal of overburden	$1.2312
Smelting operations	2.0308
Converting operations	0.3612
Total	$3.6232

Considerable mechanical economies have been effected and are due partly to alterations and additions to the plant. As several of these improvements were made late in the half-year the full benefit was not felt.

The coke works, situated at Port Kembla, N. S. W., have again supplied the whole of the coke required at the company's reduction works. A considerable quantity of coke has also been sold to outside consumers.

In compliance with the terms of the amalgamation agreement, debentures of this company amounting to £140,000, were issued in substitution for the outstanding debentures of the North Mount Lyell Copper Company, Ltd., of a similar amount. Of the above amount, £20,000 worth were purchased during the period ending March 31 in the open market at an average of £95 per cent, making the amount outstanding at that date £120,000.

The average price ruling for copper during the period embraced by the report was £57. The latest advices obtainable as to the future of the market lead your board to look for a maintenance of the present price, but in view of the many factors which influence the market it is difficult to forecast with any certainty its movements.

The company's liquid assets amounted to £223,780 at the close of the year.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Hot Blast in Pyrite Smelting.—I have been trying, by means of thermo-chemical determinations, to make clear the advantages of a hot blast in pyrite smelting, and to this end have collected all obtainable data upon the subject. However, most of my literature on this point consists of catalogues, etc., from firms handling mining machinery; needless to say, a very unreliable source from which to obtain any real scientific information. Among other assertions contained in these works, I find the following: "The amount of cold carried into the furnace by the air is one and one-half times that which is carried in by the furnace charge." Can you kindly give me a little information on this subject?—T. L. G.

Answer.—The statement quoted is rather ambiguous. A large blast furnace, running on

a highly pyritic charge, may smelt per 24 hours 400 tons of material, and will need a blast of about 14,000 cu. ft. of free air per minute, weighing, say, 1,000 lb.; 1,000 lb. of air per minute means 720 tons air per 24 hours. This air may be assumed to have a specific heat one and one-half times greater than the materials of the charge. This gives everything necessary to make the calculation, which is very simple. Mr. Genter can learn more about pyritic smelting from the recent contributions in this JOURNAL, and the review of the same by Dr. Peters, than from any other source.

Molybdenum Ore.—Will you kindly inform me whether the specimen I send you is molybdenum ore? There is a large deposit of the mineral which apparently would be valuable in case it contains molybdenum.—T. L. B.

Answer.—The mineral, so far as can be determined from general appearances, is probably graphite. It has a black streak, rather than the bluish gray of molybdenite. The two minerals are closely related, however, in physical characters and it might be well to make further tests. Molybdenite is decomposed by nitric acid, yielding a white substance (molybdic oxide), and gives off sulphur fumes when subjected to the blow-pipe. Graphite on the other hand is very resistant to all tests.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

ACQUISITION OF TITLE TO MINING CLAIMS BY ALIENS.—In answer to several enquiries lately received, we give the following summary of the law on this subject, from Lindley's 'Treatise on American Law Relating to Mines and Mineral Lands,' Volume I, Section 234, which sums up the question very clearly:

"The following conclusions are clearly deducible from the current of judicial authority:

"1. An alien may locate or purchase a mining claim, and until 'inquest of office' may hold and dispose of the same in like manner as a citizen.

"2. Proceedings to obtain patents are in the nature of 'inquest of office,' and in such proceedings citizenship is a necessary and material fact to be alleged and proved.

"3. In all other classes of actions between individuals with which the government has no concern, citizenship is not a fact in issue; it need be neither alleged nor proved.

"4. Naturalization of an alien at any time subsequent to either location or purchase is retroactive and enables him to proceed to patent. The antecendent bar to patent by reason of his alienage is removed.

"5. An alien may take title by descent to an unpatented mining claim in the absence of a State law inhibiting it. He may hold such title until 'office found.'

"We think that the decision by the Supreme Court of the United States in McKinley Mining Company v. Alaska United Mining Company, to the effect that a location by an alien is free from attack except by the government, establishes the law that no rights may be initiated by a citizen through a relocation of the ground appropriated by an alien, until the latter's title has been determined by the government. Prior to that time the ground would not be open to location or relocation. One attempting to relocate the ground could not connect himself with the government title, and would acquire no rights whatever. If he should institute an adverse suit based upon such pretended relocation he might assist the government in preventing the alien from securing a patent, but such a result would not validate his pretended location."

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week Ending July 5, 1904.

763,952. METAL-ROLLING MACHINE.—Peter Blondell, Tonawanda, N. Y. A roll comprising a body portion, a facing-sleeve fitting onto said body portion and having apertures formed therein and a groove formed in its inner face, and a die located opposite each aperture, each die having a shank extending through said sleeve and each shank having its inner end headed in said groove.

764,015 and 764,016. PRESSURE-GAGE.—George Spencer, Somerville, Mass., assignor to Crosby Steam Gage & Valve Company, Boston, Mass. In a pressure-gage the combination, with the operative parts of the gage mechanism including the dial, of a cup-shaped gage-case and a gage-socket, the latter contacting with the curved wall only of the case and in curvilinear contact therewith; all the said operative parts being supported by the gage-socket independently of the gage-case.

764,044. PROCESS OF SMELTING AND REDUCING METALS.—Christian Diesler, Coblentz, Germany. A process consisting in mixing the materials to be treated with carbonate of lime and carbon, placing the mixture in an air-tight retort, exhausting the air from the retort, subjecting the mass to the action of an electric current within the retort and to the action of the gas generated therein in excess of five atmospheres of such gas, and exhausting such resultant gas after it has acted on the materials treated.

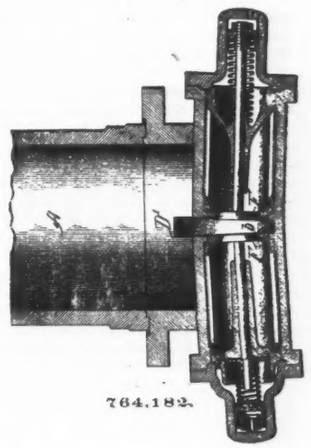
763,049. GAS-WASHER.—Olaf N. Guldlin, Fort Wayne, Ind. In a gas-washer, a perforated plate having inclined wings or guards at the perforations for deflecting the streams of gas and accelerating the flow of liquor, in combination with means for supplying gas below, and liquor above said plate.

764,071. GRINDING-MILL.—Asahel H. Patch, Clarksville, Tenn. In a grinding-mill, a frame-plate having a bearing-boss projecting from one side and a rim or flange projecting from the opposite side and formed with U-shaped bends, a spindle journaled in said bearing-boss and carrying a rotary grinding-plate mounted to rotate within said rim or flange, and a co-operating fixed grinding-plate fitted and secured within said rim or flange and having correspondingly-disposed lugs fitting within the bends thereof.

764,099. PROCESS OF DESULPHURIZING OIL OR DISTILLATE.—Otto P. Amend, New York, N. Y. A process of desulphurizing oil or distillate which consists: in removing the sulphureted hydrogen and neutralizing the fatty and organic acids contained therein; then in exposing the oil or distillate with its sulphur or sulphur compounds to the action of a soluble salt of copper in the presence of an alkali; in removing the excess of copper and copper hydrosulphides and exposing the oil or distillate and any hydrosulphide of copper remaining therein, to the oxidizing effect of one or more oxidizing agents; in removing the resulting copper sulphates and settling the oil.

764,174. THERMO-ELECTRIC ELEMENT.—William H. Bristol, Hoboken, N. J. A thermo-electric couple, one element of which consists of tungsten or wolfram steel.

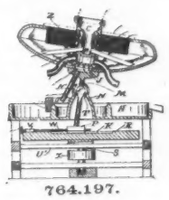
764,182. AIR-COMPRESSOR.—Charles J. Diedrich and Anthony F. Cramer, Detroit, Mich. In a compressor, the combination with the cylinder, of a chamber exterior to and extending transversely across the base of the cylinder proper and containing converging valve-seats forming between them a tapering pocket leading to a port through which said chamber communicates with the cylinder, a spring-



764,182.

pressed suction-valve in said chamber at one of said seats, and a spring-pressed delivery-valve in said chamber at the other of said seats.

764,197. CONCENTRATOR.—Charles H. Muhleman, Los Angeles, Cal. A concentrator pan mounted upon a shaft; riffles in the bottom of said pan arranged in radial rows; and means to give said pan



764,197.

a rotary gyratory motion comprising a bearing for said shaft intermediate its ends, in which said bearing said shaft is revoluble; a revoluble wheel having a socket into which the lower end of said shaft projects, said socket being at one side of the center of said wheel.

764,201. APPARATUS FOR REMOVING DIRT FROM EXCAVATIONS.—William J. Newman, Chicago, Ill.—A dumping apparatus comprising a sloping track, the upper part of which is substantially horizontal, a dumping-car having traction-wheels which travel on the rails of said track, a guide-hopper located below the uper part of said track, inclined deflector-bars located laterally outside of the track-rails near the upper end thereof, parts on the sides of said car adapted to engage said deflector-bars to tilt the car when the latter reaches the upper end of the track, a door for closing the front end of the car and attached to a frame which is hinged to the car and a cable for drawing the car from the lower to the upper end of the track and attached to the upper side of the door, whereby the pull of said cable acts to hold the door closed while the car is traveling up said inclined track, but pulls the door open when the car is brought to its dumping position.

764,202. APPARATUS FOR REMOVING DIRT FROM EXCAVATIONS.—William J. Newman, Chicago, Ill. An apparatus for removing dirt from excavations comprising a sloping track extending from the bottom of the excavation to a point outside the same, a dumping-car traveling on said track, means at the upper end for dumping said car, a plurality of branch tracks laid on the bottom of the excavation, and means for transferring the said car from the branch tracks to the foot of the sloping track and vice versa, embracing a cable which is trained about a centrally-located sheave or sheaves at the foot of said sloping track and adapted for connection with the car when on any of said branch tracks.

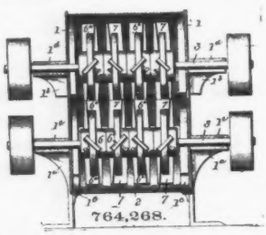
764,204. MERCURY-PUMP.—Henry N. Potter, New Rochelle, N. Y., assignor, by mesne assignments, to Cooper Hewitt Electric Company. In a mercury-pump, a tank included in the mercury-circuit, a riser leading from the said tank, and an air-pressure pipe leading into the tank, in combination with an electrically-operated valve controlling the passage of the

air in the said pipe, and a diving-bell contact device controlling the operating-circuit of the valve.

764,250. MAGNESIA-CEMENT COMPOSITION.—Heinrich Mielck, New York, N. Y., assignor to Joseph L. Sackman, Brooklyn, N. Y. A magnesia-cement composition for artificial stone, containing burnt magnesia, magnesium chloride, slaked lime, and residue of the ammonia-soda manufacture.

764,251. PROCESS OF PRODUCING NITRATE OF AMMONIUM.—Emil Naumann, Cologne, Germany. A process of producing nitrate of ammonium from nitrate of sodium and sulphate of ammonium consisting in preparing a mixed aqueous solution of these salts and boiling down said solution, precipitating thereby sulphate of sodium, separating the hot mother-lye from the precipitate and cooling same down to about the limit of its saturation for nitrate of ammonium whereby the double salt of ammonium-sulphate is precipitated, separating now the new mother-lye from the double-salt precipitation and subjecting said new lye to a compulsorily-accelerated but otherwise undisturbed cooling whereby practically nitrate of ammonium alone is precipitated, and separating same from the lye.

764,268. PULVERIZER AND GRADER.—James W. Boileau, Denver, Colo., assignor of one-half to James B. Knoblock, Denver, Colo. A pulverizer-



764,268.

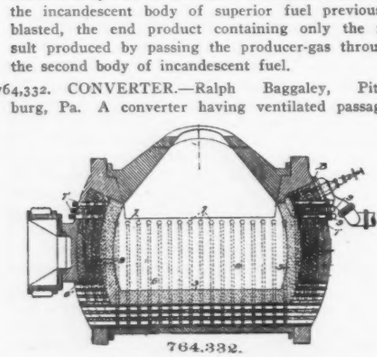
wheel comprising a disk having radial blades extending from a point near the hub thereof and projecting obliquely on each side of the disk, said blades having their obliquity alternately reversed.

764,283. FASTENING DEVICE FOR IMPLEMENTS.—Charles Ehrenfeld, Pasadena, Cal. The combination with an implement-head, provided with a socket adapted to receive a handle, of a handle therefor, jaws having projecting ends taking into said head, the shanks of said jaws having tapered portions extending out on the handle and provided at their ends with means adapted to take into said handle, and a clamping-ring adapted to spring over the tapered portions of said shanks to hold said jaws in place.

764,298. PITCH-CHAIN.—Francis Ley, Epperstone Manor, Nottingham, England. The combination of a chain-link having side members provided with openings, a lug projecting into one of the openings, a tubular bushing extending from one side member to the other and engaging said lug so that it will be locked to the link, and a roller mounted on the bushing, said link having a segmental cross-piece partly encircling the roller.

764,320. PROCESS OF MAKING GAS.—Desiderius Turk, Riesa, Germany, assignor of one-half to Franz Josef Maly, Aussig, Austria-Hungary. A process of forming gas of high caloric value which consists in blasting a body of inferior fuel, and also blasting a superior body of a better fuel, after which the air-blast is shut off from the second body of fuel and the producer-gas generated by blasting the first body of inferior fuel is then passed through the incandescent body of superior fuel previously blasted, the end product containing only the result produced by passing the producer-gas through the second body of incandescent fuel.

764,332. CONVERTER.—Ralph Baggaley, Pittsburg, Pa. A converter having ventilated passages



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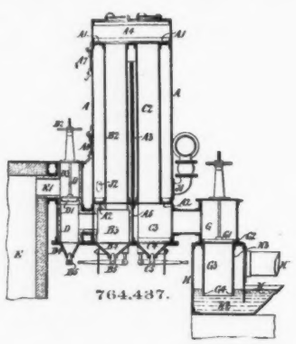
open to the air at the bottom, and other passages leading therefrom upward along the shell.

764,355. DUMP-CAR.—Harry S. Hart and Otto W. Meissner, Chicago, Ill., assignors to Rodger Ballast Car Company, Chicago, Ill. The combination of a supporting-framework provided with upwardly-extending side boards formed of swinging sections pivoted at their upper edges, and locking angle-bars pivotally secured to the framework of the car near the sides thereof to engage with the lower free edges of the swinging doors to seal and hold the same in locked position.

764,361. MAKING PRODUCTS OF CEMENT OR CEMENTITIOUS MATERIAL.—William E. Jaques, Grand Rapids, Mich. An improvement in making a cement or cementitious product or artificial stone consisting in mixing sand, or substituted material, with cement or cementitious substance in suitable proportions; then compacting the mixture and impregnating it with moisture, and then mechanically compacting the wet or moistened mass by pressure mechanically applied at the exterior of the mass.

764,417. DUMPING-CAR.—McKinley Boyle, New York, N. Y., assignor to Continental Car and Equipment Company, New York, N. Y. A dumping-car comprising a truck, a body mounted to swing thereon, side boards or doors for the body, swinging arms to which said side-boards are connected, horse-arms having swinging connection with the truck-frame, and means for detachably and slidably connecting said horsearms to the arms carrying the said boards.

764,437. SUPERHEATER FOR GAS-PRODUCERS.—Alfred B. Duff, Pittsburg, Pa. Superheating apparatus for use in connection with gas-producers, comprising, in combination, a circular casing, or shell, a manhole-door therefor, upper and



764,437.

lower tube-plates therein, an upper box part arranged above the top tube-plate, and a manhole-door in said box, a set of up-comer and of down-comer gas-tubes fitted between the tube-plates, the area of the tubes and the space between them and the casing being sufficient to admit of cleaning and repairs without dismantling, a baffle or air-deflecting plate fitted between the respective sets of tubes, separated inlet and outlet bottom spaces arranged within the shell below the bottom tube-plate and connected respectively to the up-comer and the down-comer sets of tubes, a dust-box for each tube fitted to the bottom spaces, an inlet valved chamber, with dust-box attached, connected to the inlet-bottom space and to the main gas-outlet of the producer, and an outlet valved chamber, an inlet and an outlet for air, or air and steam, for combustion in the producer.

764,443. PROCESS OF MAKING HYDROCYANIC ACID.—Walther Feld, Hönningen-on-the-Rhine, Germany. A process of making hydrocyanic acid by aid of mercuric compounds from matters containing iron cyanides, which consists in treating them with alkaline substances which will precipitate ferric hydroxide from ferric salts, and with mercuric compounds together with a salt of a metal the hydrate, oxide and carbonate of which do not precipitate mercuric compounds from mercuric solutions, separating the mercuric-cyanide solution thus formed, from the precipitate and decomposing the mercuric cyanide by distillation with acid.

764,448. ORE-WASHER.—Frank H. Frankenberg, Pueblo, Colo. An ore-washing machine comprising a tank, standards extended upward therefrom, a water-tank supported at the upper ends of said standards, water-distributing pipes extended from the tank downward at the front and rear sides of the standards, the said pipes having horizontally-disposed sections provided with perforations, carrier-chains supported by the standards, and buckets mounted on said chains, the said buckets being arranged in pairs of reverse order.

764,453. PROCESS OF MANUFACTURING CEMENT.—Gustav Geissler, Sr., and Gustav Geissler, Jr., Gratz, Austria-Hungary. A process of manufacture of cement, which consists in smelting the mixture of the raw materials with the admission of oxygen of as pure a quality as possible and subsequent granulation of the molten product.

764,476. DUMPING-CAR.—Victor Kouns, Mokane, Mo. A plurality of connected dumping-cars, means for holding the car-platforms in horizontal position, and mechanism for simultaneously releasing the holding devices and dumping all of the cars.

764,521 and 764,522. HYDRAULIC PRESS.—Edward Crowe, Sheffield, England, assignor of one-half to Davy Bros., Ltd., Sheffield, England. In a downwardly-acting hydraulic press wherein working and lifting rams are connected to the press-head the lifting-rams being operated by pressure from an auxiliary source of supply independent of that whence power is supplied to the working ram, the combination of a valve for controlling the exhaust from the cylinder of the working ram, the body of said exhaust-valve being formed as a plunger of two diameters fitted to work in a cylinder wherein it may be acted upon by the working pressure in a direction to open the valve and by the auxiliary pressure in a direction to close the valve; a separate suction-valve on a by-pass to the exhaust-valve adapted to be held open by the flow of water from the exhaust to the cylinder of the working ram while the exhaust-valve is closed during the idle part of the descent of the press-head and to close automatically when said flow ceases in consequence of such idle descent of the press-head being arrested; and a hand-operated valve adapted to control the distribution of auxiliary pressure to and its exhaustion from the cylinders of the lifting-rams and that of the exhaust-valve plunger alternatively.

764,526. ARTIFICIAL FUEL.—Manuel C. Gama, Tacubaya, Mexico, assignor of one-half to Enrique Heuer, Mexico, Mexico. An artificial fuel consisting of crude oil, residuum from refined oil, tallow, sawdust, coal-dust and caustic soda.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending June 23, 1904.

15,775 of 1903. SAFETY LAMP.—H. R. Couper, Liverpool. Improvements in miners' safety lamps whereby wick can be ignited by producing sparks by scratching a rough surface.

16,380 of 1903. ELECTRIC ROCK DRILL.—A. H. Gibson, London. In electric rock drills, improved methods of adjusting and clamping the percussive parts, and of providing an elastic medium between the motor and the percussive parts.

16,853 of 1903. IRON ALLOYS.—C. Auer von Welsbach, Vienna, Austria. Alloys of iron with metals of the rare earth group, which give off luminous sparks when subjected to abrasion or concussion.

26,775 of 1903. FUSING RARE METALS.—Siemens & Halske, Berlin, Germany. A method of fusing tantalum, and other similar metals with high melting points, by pressing the powder into a coherent mass and clamping it between electrodes of the same metal, all in an inert atmosphere.

6,014 of 1904. ORE LOADER.—T. M. Park, Chicago, Ill., U. S. A. An improved machine for loading ore as it is stoped right on to the cars.

9,229 of 1904. MINER'S PICK.—J. Heeley, Manchester. Improved means of fixing miners' picks into handles, in such a way that they will not work loose after being used some time.

9,314 of 1904. BALL MILL.—W. Grosse, Anhalt, Germany. In ball mills, the provision of means for keeping clear the fine meshes through which the material escapes.

9,483 of 1904. MAKING FUEL BRIQUETTES.—Compagnie de Blanzy et de l'Ouest, Nantes, France. Manufacture of fuel briquettes by mixing with rosin or coal tar, and a small proportion of nitrate or carbonate of potash or soda.

9,539 of 1904. BEARING FOR CRUSHER SHAFTS.—P. Hart, Johannesburg, Transvaal. An improved top bearing for shafts of gyratory crushers.

SPECIAL CORRESPONDENCE

San Francisco. July 7.

(From Our Special Correspondent.)

The new Diamond & Caldor Railroad will run within a mile of the old Cosumnes copper mine now owned by the Rio Vista Mining Co., near Fairplay, El Dorado county. The mine was first prospected in the early '60s. The new company has opened a good body of ore and is sinking a compartment shaft.

A substantial company is buying rights of way for a railroad to Fort Jones and Etna, Siskiyou county, by extension of the Yreka railroad from Yreka for connection with the Southern Pacific at Montague. Outside of agricultural products on this line, cattle, etc., tributary to Scott Valley is the rich mining country of Salmon river, and also along the Scott and Klamath rivers which center at Etna and Fort Jones. Near Yreka are the Humbug, Cherry Creek, Hawkinsville, Klamath River and other mining sections.

Some 15,000 in. of water of the North Yuba river have been located by the managers of the proposed Marysville-Susanville electric railroad, to be used for power purposes. The water is to be diverted from the stream a mile below Goodyear Bar and carried down to near Slate creek, where it will be discharged into the river again. Below the mouth of Slate creek the water will again be diverted and carried down to Bullard Bar.

The Mountain Copper Co., which has always had its headquarters at Keswick, Shasta county, has removed them to San Francisco, where Lewis T. Wright, general manager, F. O. Hurt, his secretary, and cashier W. S. Howard now reside. The remainder of the staff, it is supposed, will remain at Keswick. The company has materially reduced the force at the mines and recently stopped buying flux in large amounts. It owns the old Judson works on the San Francisco bay shore, and will make sulphuric acid there, and has also bought land at Bull's Head Point, above Martinez. The company has been much bothered by damage suits on account of sulphur fumes, notwithstanding all it has done for the development of that district, much to the disgust of the manager and his associates.

The Sierra Nevada Water & Power Co., owning ditch and water rights on the Mokelumne river, Calaveras county, is about to build a dam 280 ft. high between Railroad Flat and West Point, across the south fork of the river, below the junction of Licking fork. The water stored will be used for electric power, irrigation and mining purposes. It will supply a wide area and will supplement the Mokelumne and Campo Seco canal.

Fresno county is about to establish a "mining bureau" in connection with its Chamber of Commerce at Fresno. Some 80 miners and mine owners in Trimmer Springs district have formed an association to start the matter, expecting help from other mining districts of the county. The idea is good, and might be followed to advantage by other counties.

The Gold Bluff placer mines, Humboldt county, have been in litigation some years. It is now reported that the Tyrell & Randall interests will assume control and shortly begin operations again. The mines have been idle many months.

Owing to the rapidly increasing output of the California oil fields at Coalinga, Bakersfield and McKittrick, the Southern Pacific Co. has ordered 250 more tank cars of 12,500-gal. capacity, notwithstanding there is a pipe line to San Francisco bay from those particular fields. In the Kern river field, prices of oil show a tendency to rise. A few weeks ago oil sold for 14c. a gallon, while some has lately sold as high as 20c. A contract for 30c. made in the Kern field recently is the highest in a long time. It is to run two years. The estimated output of the Kern fields is 50,000 bbl. per day; this estimate is possibly high, but the output is increasing satisfactorily.

Along the American river, in Sacramento county, the dredging district is about 9 miles long, from Fairoaks to Folsom, comprising some 9,000 acres, of which a third is available under present conditions. About 100 acres have thus far been dredged; 500 acres are under cultivation; the balance is grazing land, and was more or less mined in early days. There are four companies busy. The Folsom Development Co. has the largest holdings, and has two dredges at work and one under construction; the Syndicate Dredge Mining Co. has one boat, the Ashburton Co. has one dredge at work and will build another; the Colorado Pacific Co. has two dredges. The Folsom Development Co. controls among other sections the famous Natoma vineyard of 2,000 acres; the prospects are not so good as expected, however, and this land may remain a vineyard. The Sailor Bar dredge is owned by the Ashburton Co., as is that at the new town of Dredge. The dredges work night and day, using three shifts about 20 hours per day the year round. It is thought that the entire field will warrant the use of 25 or 30 dredges, but if the available field comprises 3,000 acres it will take 25 dredges about 60 years to work out the ground.

Denver. July 9.

(From Our Special Correspondent.)

A week ago it looked as though affairs in the Cripple Creek district were gradually assuming normal conditions, but during the past few days more lawless acts have been committed, and a continuance of these will necessitate the presence of the military for some time.

Complying with the order of the United States Circuit Court at St. Louis, Governor Peabody filed his answer in the Moyer case on July 5, stating that at the time of the service of the writ Charles H. Moyer had been turned over to the civil authorities. Judge Thayer issued an order giving the complainant until August 1 to answer the return.

Moyer has been brought to Denver and released on $10,000 bail. A number of other labor leaders, who had been indicted, gave bonds in the sum of $5,000. Haywood is at present in Chicago, as is also O'Neill, but both are expected to return within a few days, and give the necessary security for their appearance. Moyer has taken personal charge at the headquarters of the Federation in this city again, and does not seem to have any fears regarding the outcome of his trial.

In the night of July 6, five men, two of whom had passes from General Bell, allowing them to visit the district for a limited time, were arrested by deputy sheriffs; an armed body of about 75 assaulted them as they were being escorted out of the district, and drove them toward Cañon City. Some people in the district have evidently decided that none of the deported men shall return. A lynching was narrowly averted.

Those deported miners who have tried to return to Telluride have been deported again at once, and from all appearances it will not be safe for any more of them to return at present. Several others were deported from Telluride during the past few days, among them Thomas Nelson, the president of the Telluride miners' union.

Although a few of the deported miners have gone to work elsewhere, the majority are in this city and are being supported by the Federation. It is understood that bonds have been arranged for all who have been arrested on indictments found.

In the case of Foster Milburn, charged with dynamiting the Sun & Moon plant at Idaho Springs nearly a year ago, the jury returned a verdict of not guilty. It is understood that the cases against the other men accused will be dropped.

In consequence of the closing of Stratton's Independence mine for 30 days, pending arrangements which, it is understood, are being made for leasing the property in blocks, the works of the United States Reduction & Refining Co., at Colorado City, which receives about 200 tons per day of Independence ore will also be closed for some necessary repairs.

The coal strike in the southern part of the State is virtually over, and the Colorado Fuel & Iron Co. is making almost a full output from the mines. The long projected tin-plate mill at Pueblo, will probably be built. Yesterday, the converter plant made 640 tons of steel ingots in 12 hours, while the rail mill turned out 580 tons of rails.

Salt Lake City. July 8.

(From Our Special Correspondent.)

Excavating for the zinc-ore plant to be erected at the Horn Silver mine, at Frisco, will start early next week. Surveyors are now on the ground locating the right of way for the pipe line to supply water from the reservoir of the Newhouse Mines & Smelters Corporation at Newhouse. The lumber and machinery, ordered recently, are expected to arrive before the end of July.

The Utah Development Co. is a new mining company formed in Boston and organized under the laws of Maine. The capital stock is divided into 600,000 shares, of a par value of $5. The directors are A. J. Orem, Salt Lake; J. J. Reigel, of Boston; C. A. Baker, of Concord, N. H.; Jed F. Fanning and A. C. Percy, of Portland, Maine.

An important event of the week is the use of electric power at Alta. The Columbus Consolidated Mining Co. has started its new plant, which cost about $40,000. It contains Westinghouse equipment. The new Nordberg compressor at the mine, eight miles from the electric power plant, is also in commission. Besides supplying its own mines with power, the company will sell to other mines.

At the Cactus properties, owned by the Newhouse Mines & Smelters Corporation, work is progressing on the foundations for the new concentrator, power plant and other buildings. It will probably be 30 days before the railroad grade is ready. Material for the buildings and machinery is expected to begin to arrive when rails are laid from Frisco.

All the creditors of the Majestic Copper Mining & Smelting Co., except a few holding claims to the amount of $2,000, who could not be reached, agreed to the plan of settlement given last week. Mr. Tanner for his services as receiver demanded a compensation of $1,000 per month, or about $3,000 altogether. This amount the committee thought to be unreasonable, and will let the court settle the matter.

Bisbee. July 7.

(From Our Special Correspondent.)

The work of drifting in the Pittsburg & Duluth property is producing results. In two drifts the ground is encouraging and in one of these chalcopyrite is showing up to 12% copper. It is possible that the company will abandon some of its options and reduce its acreage. It has been reported that its August payments are to be postponed and the reorganization made later, but nothing has been settled yet.

Oliver shaft, Calumet & Arizona mine, is now 110 ft. in ore, most of which is sulphides, continuing from 710 ft. in the shaft to the bottom. The bottom are is leaner grade than some above. This shaft is not yet within 200 ft. of the depth, 1,005 ft., at which the adjoining Lowell shaft of Copper Queen began to find ore, and 1,005 ft. in Lowell corresponds to 1,085 ft. in Oliver; so the ore cut at 710 ft. in the latter is much higher than what was cut at 1,005 ft. in Lowell. In character of ores and ground the two shafts are quite similar. The general impression among mining men is that Oliver shaft proves as good as Irish Mag, from which the Calumet & Arizona has made all its earnings. Drifts in Lake Superior & Pittsburg are cutting ore in the southwest workings; this time carbonates that run well up in copper.

Pumping begins in the bottom level of Calumet & Pittsburg this week, after a year of preparation. Two Prescott pumps, of a combined capacity of 3,500 gal. a minute against a head of 1,500 ft., have been installed, and a heavy hoist is under erection. The rocks cutting into the shaft at about the 900-ft. level, and below, seem to be saturated with water. Less than 200 ft. additional depth will make this shaft a large copper producer.

June production of Calumet & Arizona was 2,624,000 lb. of blister copper. Copper Queen's June production was curtailed somewhat by the changes incident to removal to Douglas smelter, and was about 3,400,000 lb. The smelter should make, when running at regular capacity, from 3,800,000 to 4,000,000 lb. a month.

Reports come from Gold Hill that the Houghton Development Co. has cut a rich lens of copper that carries enough gold and silver to make the gross value about $500 per ton. The report is not confirmed and is probably incorrect.

Toronto. July 6.

(*From Our Special Correspondent.*)

J. M. Bell, who has been making explorations in the Michipicoten iron range district, reports to the Provincial Bureau of Mines from a point two miles east of Pacaswa on Lake Superior, that he has followed the chain of lakes from Missanabie station to Magpie river, through a hitherto unexplored region, where he has investigated three areas of iron-bearing rocks. One of these, the McDougall claim, 14 miles north of Pascaswa, has a wide band of somewhat impure magnetite running through hornblende schists, the ore body proper being 400 by 350 ft. in extent, and appearing to be valuable. Another area, situated on the same river, presents similar characteristics. Two miles north of Pacaswa the deposit extends over a quarter of a mile, but is not of great value.

The Northern Light Mining & Development Co., which owns considerable gold-mining property on Belmere bay, Sturgeon lake, is pushing development work. It is stated that at a depth of 282 ft. a cross-cut was extended, resulting in the discovery of a rich vein of quartz, test of samples showing an average value of $59 per ton. Hoisting machinery will be put in as soon as possible.

The Megantic Mining and Dredging Co. has obtained a charter from the Dominion government, with capital stock placed at $800,000. A number of Montreal capitalists are interested in the project, including Leon Sohrer, J. S. Buchan, W. H. Phillips and O. W. Pease. They have secured large areas of land in the Megantic region, under lease from the government, and it is their intention to carry on a general mining and dredging business on a large scale.

W. H. Aldridge, chief of the mining and smelting department of the Canadian Pacific Railway, states that the company is spending about $500,000 in the development of the anthracite field which it has located near Bariff, which is supposed to be the only anthracite deposit in Canada.' It is installing a preparing plant, and large supplies from this source will shortly be available.

The Pittsburg Coal Co. has selected a site 35 acres in extent for its coal-handling plant at Fort William, Ont., located on the corner of No. 2 Island, with a frontage on the Kaministiquia and McKellar rivers. It proposes erecting a plant with storage for 1,000,000 tons, as Fort William will be made the distributing port for the Canadian West. A jackknife bridge will connect the plant with the Fort William side of the river.

James V. Welch is commencing operations on the New Ontario gold mine, near Fort Frances, Ontario.

Victoria. July 5.

(*From Our Special Correspondent.*)

A dispatch from Dawson announces that No. 16 claim on Eldorado Creek, which once yielded a very large quantity of gold, though worked only in a desultory way for the past two seasons, is again to be operated on an extensive scale. It is proposed to drive a bedrock tunnel the full length of the claim.

Two seams of good bituminous coal, one 11, and the other 6 ft. thick, are reported discovered near McKay Lake, not far distant from Ladysmith, by a prospector employed by the Wellington Colliery Co. The seams are supposed to be continuations of those opened at Wellington.

First consignments of gold from Atlin are beginning to arrive at coast ports. Recently the Amalgamated McKee Creek Mining Co., made a first and the largest individual clean-up ever made in the district of over 500 oz. The concern was formerly known as the Atlin Mining Company.

An Ottawa correspondent says that Dr. Ellis, of the Dominion Geological Survey, has been sent to Nicola to establish by boring the width and extent of the coal measures. Dr. Ellis expects to be occupied for three months at this work.

The Daly reduction works at Hedley in the Similkameen are now in partial operation, but the installation of machinery is not completed. It is stated that the Olalla Co. is arranging in the East to secure additional capital for development purposes. This company owns several promising prospects, but is handicapped by a heavy capitalization.

A rich strike of free milling quartz is reported made in the upper tunnel of the Kingston mine, at Camborne, recently bonded to a Portland syndicate for $200,000. In the same camp, a gold-bearing vein of quartz of considerable width is reported encountered on the Nelson group.

John Keen, president of the Provincial Mining Association, has forwarded two 200-lb. samples of schist from different claims at Poplar Creek to Spokane, where they will be tested by the Hendryx process.

According to Mr. Buchanan, inspector of lead bounties, lead production at present, is at the rate of 30,000 tons per annum. Whether this rate will be maintained depends on the continuation of production from the St. Eugene. To the end of June, $180,000 had been earned under the terms of the Lead Bounty Act. In the case of the Last Chance vs. the American Boy, the plaintiffs won their suit for $8,500, the value of 84 tons of ore taken from the property by the defendant company. In the Slocan City division, the Edison, a high-grade property, adjoining the Neepawa has been leased. There is an unauthenticated rumor that a German syndicate proposes establishing smelting works at some point in the Slocan, this report having started because Dr. Sussman has been collecting information in the district. The south fork of Kaslo creek is again attracting some attention as a result of recently reported rich discoveries of silver ore. A number of claims are showing well under development.

In the test actions brought against the Crow's Nest Coal Co., by relatives and others injured by the colliery explosion of two years ago, Justice Martin decided against the plaintiffs, his decision being based almost entirely on the evidence of expert witnesses, who showed that the explosion was the result not of dust but of gas. Had the company lost the actions, it would have been mulcted ultimately for not less than $800,000 in damages. An appeal will probably be taken.

At Ymir, seven mines are now regularly shipping, and reports from the district are encouraging. The last monthly returns from the Ymir place working expenses at $15,000, and the revenue at $16,700. A new company is being formed to acquire and work the Dundee mine.

At Rossland, the Cliff mine is to be worked with a force of about 20 men. Experiments on Le Roi ores at the O. K. mill have started to determine what percentages of values can be saved. Le Roi profits, estimated, for June were $7,750, while the net receipts of Le Roi No. 2 were $44,990 on approximately 2,000 tons previously shipped.

Monterey. July 6.

(*From Our Special Correspondent.*)

The outcome of Mr. G. W. McElhiney's efforts to form a combination of Guanajuato mines, including the great old Valenciana, is shown by the formation in Denver, Colo., of the Guanajuato Reduction & Mining Co., with a capital of $7,500,000 gold. C. L. Kurtz, of Columbus, Ohio, is president; H. L. Hine, Colorado Springs, vice-president; L. E. Curtis, Colorado Springs, second vice-president and treasurer, and J. W. Bonbright of Colorado Springs, secretary. The Guanajuato Electric & Power Co., and the American Finance & Securities Co., are largely interested. Of the capital, $2,500,000 will go toward the purchase of the Rul estate, and for equipment, including two 500-ton stamp and cyanide mills.

In the Maconi district, of Queretaro, Mr. E. A. H. Tays is doing much construction and repair work preparatory to starting up the old Maconi-Doctor mines by the United Mining & Development Co., of New York.

San Luis Potosi is greatly exercised over a concession, said to have been given to a number of wealthy Mexicans, for prospecting the streets of the city to learn if the dirt can be treated in a cyanide plant, the reason being that much of the grading was done with tailings from the old *haciendas de beneficio*, or patio plants, treating San Pedro ores. Many old dumps are now profitably cyanided by Ardila & Espinosa, by Roberto Ypiña, and by Frances Eschauzier, who sell the precipitates to the National Metal Co. The concession permits digging up the tailings from the streets and replacing with common dirt. It is understood that several of the principal plazas are included.

Mr. C. A. Shafer, of Kansas City, is in Parral negotiating with Grant G. Gillett, a fugitive from justice, who is endeavoring to settle his old accounts by turning over to his creditors certain properties in the neighborhood of Parral, which he values at between $700,000 and $1,000,000 gold, among them the Quebradillas.

The English company operating the Union mill, in Parral, has gone into voluntary liquidation, being satisfied that it has not the correct process. The Encinillas, Ltd., has put in new machinery and is planning to increase the daily smelter capacity from 100 to 300 tons. The Julieto, near Jimenez station of the Mexican Central Railroad, is still negotiating with the American Smelting & Refining Co. The Pinos Altos, in the Jesus Maria district, has been sold to Colorado Springs people, through R. C. Thayer. W. H. Dunham, accompanied by W. J. Barnett and A. E. Barton, of London, visited the Dolores mine. Mr. Barnett made an examination of the property adjoining the Dolores. The Adventurera, of the Northern Mexico Development Co., at Sabinal, is to be opened by Briton Davis, of El Paso. The Europa (under option) and the Juarez, of the Vencedora Gold Mining Co., are being started up under the management of G. A. Burr, of Parral, and a 40-ton cyanide plant is contemplated. A 150-h. p. gasoline engine is being erected for the electric plant of the San Francisco del Oro mine near Santa Barbara.

In the State of Mexico the formal transfer of Mount Popocatepetl to Captain Charles Holt, representing a New York syndicate, including S. H. Green, Lyman S. Andrews and J. A. Roberts, is reported made by General Casper Sanchez Ochoa, for the sum of $500,000, gold, of which amount General Ochoa has received a cash payment of $300,000. Negotiations covering the purchase have been under way for some time. The new owners may build a cog-wheel railroad from the base of the mountain, put up an aërial tramway, and establish a great electric power plant. They will develop the sulphur deposits situated in the crater of the volcano. It is stated that Gen. Fernando Gonzalez, of Mexico, will be president of the company.

London. July 2.

(*From Our Special Correspondent.*)

Prospectuses of new mining companies are not plentiful nowadays, and those which do appear are published to comply with the Stock Exchange regulations, and not in expectation of receiving applications for shares from the public. Two interesting prospectuses, however, have recently made their appearance. The first of these is of the Sudan Gold-fields, Ltd. This company is brought forward by John Taylor & Sons, and there is never any doubt about the success of this firm's flotations. They know beforehand just what amount of support will be given them by their friends, and they seldom trouble the Stock Exchange. The new company is formed to acquire from the Egypt & Sudan Mining Syndicate prospecting rights over 22,000 square miles of territory, situated between latitude 20° and 22°, and longitude 32° and 34° 30'; also certain properties already located. It is a subsidiary corporation, taking over part of the rights belonging to the parent company. The Egypt & Sudan Syndicate was formed three years ago by John Taylor & Sons, to explore in the Egypt territory. The prospecting work has been under charge of Arthur Llewellyn, who is well known in connection with the Mysore goldfield. The chief property so far opened up is at Nabardi, where ancient workings have been discovered and developed. With the money now raised it is intended to do further development and provide machinery.

The other company floated is the Kelantan Gold Dredging Co., No. 1, Ltd. It has been formed to acquire from the Duff Development

Co. dredging rights on the Kelantan river, in the Malay peninsula. The Duff Development Co. owns concessions in the native State of Kelantan, which were acquired from the Rajah, by Mr. R. W. Duff. On the river there are many places where the beds and banks have proved to be gold-bearing, and it is believed that the gravels can be easily handled by dredging. Tests have been conducted with a prospecting dredge by Mr. Toby, who has had a good deal of experience in New Zealand. The issue of shares is intended to provide working capital and to build dredges. The issue is underwritten by some good commercial houses, of whom James & Shakespeare, the metal merchants, and James Morrison & Co. are well known to mining engineers. The venture seems to contain elements of success.

The report of the Tyee Copper Co., working the mines at Mt. Sicker, Vancouver Island, for the year ended April 30, is very interesting reading, and shows that the mine is substantiating the faith of Mr. Clermont Livingston, to whose energy the present satisfactory state of things is due. The smelter has now been in operation for over a year, and during the twelve months under review treated 56,000 tons of ore, yielding 5,454 tons of copper matte, containing 4,446,987 lb. of fine copper, 143,000 oz. fine silver and 8,778 oz. fine gold. The matte is sold to smelters in the United States. Originally it was intended to ship the ore itself in this way, but it was found that the cost of a smelter was far less than that of shipping the ore; in fact, it is probable that the cost of shipping the ore would have been prohibitive. The mine continues to open up very satisfactorily, and it is now becoming evident that the three ore-bodies worked are really part of one great body, instead of lenticular masses, as originally supposed. The veins are irregular in width, and the mine manager, Mr. Musgrave, will not commit himself to an exact estimate of the reserves. It is quite certain, however, that there is a year's supply ready for stoping, and that developments continually expose further bodies of ore. The finances of the company are in excellent condition. A dividend for the year, amounting to 10% on a capital of £180,000, has been paid, and £11,000 written off for development, etc. There is already a reserve of £21,000, all in British Government securities. Altogether, Mr. Clermont Livingston is fully justified in feeling proud over the results.

Melbourne. June 8.

Mr. Waldemar Lindgren's long-expected report on the Bewick, Moreing & Co. group of deep lead mines at Moolort has been received in the State, and a digest of it was published in the leading daily, the *Argus*. Mr. Lindgren, while here, was the reverse of the usual Yankee mining man that comes this way—he kept himself in the background like the modest scientist that he is, and he won many admirers as a consequence. What we wanted to keep him longer for, however, was to pay some attention to the influence that certain formations have on the deposition of gold in the Indicator series at Ballarat and at Bendigo. But he stuck to his duty as a leech clings to a bare leg. As far as his reports go, however, the truth must be told. We think him as daring as he otherwise was modest. There has never been any one prior to him who has attempted to estimate the contents of miles of a deep lead before it has been proved by the actual test of mining. Even when it has been cut up by workings there has never been any one who has tried to estimate the gold in the gutter. Mr. Lindgren has gone that far, and hence we view him with awe and admiration. Still, there are risks in what he has done. Take the case of the Main Leads mine at Maryborough, where the 'cutting up drives'—these are drifts which cut up the wash into blocks of moderate extent so as to facilitate drainage prior to their being blocked or paneled out—went through 25 dwt. dirt. When they came to panel the blocks, the average value dropped to under 10 dwt. This is not at all an isolated instance, and I wish it, and the other cases, had been driven into Mr. Lindgren's head before he decided to estimate the worth of the wash in mines in which the gutter has never been entered. Certainly bores have been put up from the drifts in the Loddon valley to prick the water, but these often give misleading results. This must not be taken as written in a captious spirit, but when so much stress is now laid on mining men not estimating beyond what is actually in sight, the temptation to point out the risks of estimating in any way the return from properties that have never been developed and are not beyond the pumping stage is irresistible. The possibility is that the gold is there because the history of the upper portions of the Berry and the Majorca leads, on which the mines examined are situated, have been uniformly good. But there is no certainty about it. In the case of the Berry lead there is a gap of at least 12 miles from the nearest gold producer. Then leads without adjoining quartz reefs or auriferous bearing formations cannot be relied on to prove profitable, and when a big stretch of the adjoining country is covered with basalt no one can know if gold-bearing formations exist on the bed-rock hidden 350 ft. below the surface. Mr. Lindgren, however, has our best wishes; we appreciate and share his belief in the future of our leads, and we are delighted in a tremulous sort of way to find that he has the pluck to write what we have only dared to think, but never to prove. Still, we are not quite sure that what he has done is scientifically exact. It is not in conformity with our general mining practice, anyway, except in so far as we look to find gold in the lead lower down from where work is being carried on in its upper reaches.

Messrs. Mitchell and Hertzig are controlling the affairs of the Loddon Valley, Moolort and Victorian Deep Lead companies as the representatives of Messrs. Bewick, Moreing & Co., and they are importing an American "push" into the work which is much appreciated. The firm has centralized its business in Melbourne, and has secured the services of Sir Alexander Peacock, the ex-Premier of the State, to act as chairman of the local advisory boards. The choice is a very happy one, as Sir Alexander has all his life been associated with lead mining and has the secretaryship of some of the best companies of the kind in the State.

The report on the Mount Lyell Mining & Railway properties by Mr. Robert Sticht, general manager, came as a profound shock to our investors. Briefly the position is that the Mount Lyell mine contains 4,495,310 tons of copper ore down to the 800-ft. level of an average grade of 0.59% copper, 1.99 oz. silver and 0.04 oz. gold. Of this quantity 1,613,198 tons of an average grade of 0.66% copper, 1.90 oz. silver and 0.049 oz. gold can be open cut. The value of the whole of the material can be taken roughly at 15s. per ton. In the North Lyell there are 170,494 tons of ore with 6.25% copper, 2.25 oz. silver and 0.005 oz. gold in sight down to the 500-ft. level. Since the report was issued several developments have taken place which have added materially to these ore reserves. But on Mr. Sticht's figures the ore in the North Lyell is only sufficient for less than two years' work, as he treated 54,846 tons of it in the past eight months. The Mount Lyell ore is now of use mainly for fluxing and fuel purposes, and as it is the only deposit of the kind on the field, the possession of it ensures domination to the company owning it. Attempts are being made to concentrate the low grade copper-bearing chlorite schists of the field by wet magnetic separators, and the results achieved have been unusually gratifying. Thus with improved methods the mine may have a far longer life than outside critics would give it. Mr. Sticht's work has been marvelous, for he has brought his costs down to 15s. 1-16d. per ton, a saving of fully 3s. per ton on the previous year's results.

Sydney. June 14.

(From Our Special Correspondent.)

The gold-mining industry of New South Wales is in a satisfactory state. The yield for May was 17,963 oz., fine, as against 10,852 oz., fine, for May, 1903; the yield for the five months shows an increase of 34,172 oz., fine, over the same period last year. Good returns are obtained by mines on the Cobar field, especially by the Mount Boppy Co. At the True Blue mine, Wyalong, sulphide ore is being raised from the 800-ft. level, which averages 11 oz. per ton. The New Hillgrove Proprietary mines have crushed 150 tons for a return of 1,350 ounces.

The total May gold yield for Queensland was 60,330 oz., fine, a decrease of 5,225 oz. from last year. The Charters Towers field gives signs of a slight depression. The Brilliant Central is the largest producer at present, and is expected to declare a bonus, during June, of 1s. per share in addition to the usual 1s. dividend. The Queen's Cross mine maintains dividends; the last crushing of 1,200 tons returned 2,643 oz. Events in connection with the No. 2 South Great Eastern mine have seriously affected the holders of stock on the Gympie field. It seems that the rich ore cut out, and crushings were sweetened from a reserve stock of between 5,000 and 6,000 oz. of amalgam, without the knowledge of shareholders, while those behind the scenes were able to sell out. Shares dropped 30s., and the capital value of the mine depreciated £216,000. The whole matter is now the subject of investigation at the instance of the shareholders. The Mount Morgan mine treated 20,067 tons of ore during May for a return of 14,705 oz. The total dividends paid by Queensland mines during May amounted to £83,260.

In New South Wales, the silver mines along the main line of lode at Broken Hill are considerably augmenting their output. The several processes for recovering zinc from the tailings at a profit have passed the experimental stage. The Proprietary Co. expects to have its large plant (Delprat's salt-cake process) completed during June. The Junction North Co. is installing Ulrich magnetic separators capable of treating 800 tons weekly. The Block 14 Co. is adopting the Potter (acid) process; some 1,500 tons of tailings, direct from the dump, by this process yielded zinc 70.3%, lead 24.5%, and silver 50%. The Broken Hill Block 10 Co. reports a profit of £12,500 for the half year ending May, as compared with a loss of £1,700 for the preceding term. The Great Cobar Copper Co. has purchased, subject to ratification by the shareholders, the Cobar-Chesney Co.'s property for £40,000 in cash, and a further £10,000 on terms.

The New Chillagoe mines treated 4,647 tons of ore during May for 127 tons copper, and 31,971 oz. silver. Considerable interest has been aroused by the discovery of valuable tin deposits by a number of Chinese working at Fort Darwin. Tin ore to the value of £4,000 was taken from an area of 25 by 15 yd., in the course of three months, from an open cut only 4 ft. deep. The latest information is that ore valued at £30,000, and assaying 75%, is at grass.

The coal trade in New South Wales is fairly brisk. The exports from Newcastle during the past four weeks amounted to 116,570 tons: of this 64,039 tons went to the west coast of South America, 10,502 tons to California and 23,501 tons to Manila.

The citizens of Sydney have been greatly exercised by the decision of the Mines Department to grant leases to remove coal from beneath the catchment area of the Sydney water supply. The under secretary for mines has prepared a careful estimate of the value of the coal underlying this area, and after making every allowance for impurities, waste, etc., is of the opinion that the same may be set down at £509,760,000, which would yield a royalty to the Crown of £28,320,000. The citizens protest against mining being permitted for fear of pollution of the water, and present indications point to their wishes being respected, and to the indefinite locking up of this mineral wealth.

The White Cliffs opal market is exceptionally dull, medium class stone being practically unsalable. Owing to the increase in the market price of wolfram, there is more activity in the search for this mineral, and several large parcels have recently been exported.

The Broken Hill Proprietary mine has made a satisfactory test of the sulphuric acid plant. Block 10 mine shows a profit of £12,680 for the six months ending March 31, as compared with a loss of £1,770 during the previous half year. New Hillgrove Proprietary has cleaned up for 630 oz. from 120 tons ore.

The last year's report of the Cobar Gold Mines, Ltd., shows that 64,937 tons of ore were treated.

The April yield for the State was 14,257 oz. fine, and for the four months of the year 191,504 oz. fine, valued at £430,315, compared with £271,636 last year.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of the ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL, and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and be of any service to them that they can.

TO ENGINEERS VISITING LONDON.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers nonresident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodations in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep the ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Mr. Wm. A. Akers, of Butte, is visiting New York City.

Mr. Ben. B. Lawrence has returned from Colorado.

Dr. F. Wilder has been appointed State Geologist of Iowa.

Mr. Philip Argall, of Denver, has returned from a visit to Chicago.

Mr. W. R. G. Rivington has reached London from New South Wales.

Mr. Percy L. Fearn left New York July 12 on a professional trip to Idaho.

Mr. J. M. Haig is manager of the Golden Links mine in Western Australia.

Mr. E. W. Sebben, of Denver, is examining mines in Gilpin county, Colorado.

Mr. H. Y. Russel is engineer to the Blue Bell Mining Co., of Red Mountain, Colorado.

Mr. R. C. Shaw has returned to New York from the Bella Vista mines in Costa Rica.

Mr. J. H. Curle has moved his office from Salisbury House to 62 London Wall, E. C.

Mr. A. H. Morgan, chief engineer of the Burmah Ruby Mines, Ltd., is visiting London.

Mr. Robt. T. Hill is expected at Washington about July 10, on his return from Mexico.

Mr. A. D. Bridge, of Monterey, Mexico, is on an extended trip to Boston and New York.

Mr. Geo. A. Schroter is in London, on his way to Russia, on important professional work.

Mr. Edwin C. Holden leaves New York on July 14 to examine mines in Chihuahua, Mexico.

Mr. A. C. Beatty sails on the *Cymric* from Boston on July 14, to take a holiday in Europe.

Mr. Francis Drake sailed by the *Kaiser Wilhelm II.* on his return to South Africa, via London.

Mr. Thos. L. Darby, of Denver, has moved from No. 505 to No. 529 Mining Exchange Building.

Mr. Jesse C. Scobey will be at Richmond, Va., about July 15, on his return from Guadalajara, Mexico.

Mr. T. B. Jennings has resigned the management of the Guinea Fowl mine, near Gwelo, in Rhodesia.

Mr. E. P. Mathewson, manager of the Anaconda Copper Mining Co., was in New York during the week.

Mr. Samuel T. Peters, of the firm of Williams & Peters, New York, has returned from a six weeks' trip abroad.

Mr. Edwin C. Eckel, of the United States Geological Survey, has returned to Washington from North Dakota.

Mr. Horace J. Stevens, author of 'The Copper Handbook,' is on a visit to New York from Houghton, Michigan.

Mr. E. H. Teats has arrived in New York from Surinam, Dutch Guiana. He will return thither in September.

Mr. Laurence Pitblado, of London, passed through New York on his way to Brisbane, Queensland, via Vancouver.

Mr. Percy Williams, of Salt Lake City, and Mr. W. B. Raymond are visiting a number of mining camps in Mexico.

Mr. F. J. Pope, of Ricketts & Banks, starts from New York this week to examine tin mines in the York district, Alaska.

Mr. W. D. Wilson, of Hamilton, and Mr. Alex. Smith, of Toronto, Ont., are visiting Los Reyes mines in Oaxaca, Mexico.

Mr. E. M. Bind, consulting engineer, has left Torreon for Chicago on mining business, and will return to Mexico by August 1.

Mr. Chester A. Beatty, of the Guggenheim Exploration Co., left Denver on July 9, for New York, and will go to Europe.

Mr. Fred Harris has severed his connections with the Rand Drill Co., for which he was formerly sales agent at Butte and Salt Lake City.

Mr. R. H. Williams, of Williams & Peters, New York, sailed on June 29 by the *Oceanic* for Europe, and will be away about two months.

Mr. Charles C. Jones, formerly mining engineer for the Mountain Copper Co., of Keswick, Cal., is now at Salt Lake, where he will reside.

Mr. Geo. W. Maynard returned to New York from Nevada last week; he is now on his way to Nova Scotia and the west coast of Newfoundland.

Mr. A. C. Flumerfelt, of the Granby Consolidated Mining & Smelting Co., and of the International Coal & Coke Co., has returned to Vancouver from New York

Mr. H. W. Henry, chief clerk to Mr. Hartman, general coal agent of the New York Central Railroad, has been appointed assistant general coal agent of the road.

Mr. G. McM. Ross, who has resigned as superintendent of the Andes mine at Virginia City, Nev., is now manager of the Union copper mines at Copperopolis, California.

Mr. Chas. P. Pollak has resigned his position as eastern representative of Wickes Brothers, Saginaw, Mich., and will enter the employ of Fairbanks, Morse & Co., Chicago, Ill.

Mr. James Breen has returned to Spokane from a trip to New York, on business connected with the sale of the Dominion mine at Phoenix, B. C., to the new Montreal & Boston Co.

Mr. E. C. Knight, manager of the Monterey plant of the American Smelting & Refining Co., has returned to Monterey, after an absence of over a month at St. Louis and New York.

Mr. W. C. Whitley, manager of the Salt Lake plants of the American Smelting & Refining Co., has returned to Salt Lake from a trip to California camps and to Tonopah, Nevada.

Mr. Edwin E. Chase, of Denver, delivered a lecture last week on the 'Economic Geology of Gilpin and Clear Creek Counties' to the summer school of mines at Silver Plume, Colorado.

Mr. John E. Ryan, as already announced, will have general charge of the business of the Amalgamated Copper Co., in Montana, with Mr. C. W. Goodale as manager at Great Falls, Mr. John Gillie at Butte, and Mr. E. P. Mathewson at Anaconda.

Mr. William Yolen Williams, who resigned as superintendent of mines of the Granby Consolidated Mining, Smelting & Power Co., on July 1, has removed to Spokane, Wash. He will be retained by the Granby management in a consulting capacity.

Mr. A. M. Mattice, chief engineer of the Allis-Chalmers Co., returned recently from a trip to Europe during which he visited the hydraulic machinery works of Escher, Wyss & Co., of Zurich, Switzerland, and the Nurnberg Gas Engine Works at Nurnberg, Germany.

Mr. Henry G. Davis, the Democratic nominee for Vice-President, has long been connected with coal mining in West Virginia. He was interested in building the West Virginia Central & Pittsburg Railroad, and in forming the Davis Coal & Coke Co. and is now active in the affairs of the Davis Colliery Co., and the Coal & Coke Railroad.

OBITUARY.

George H. Longbottom, of the American Locomotive Co., died of heart trouble at Paterson, N. J., July 7. He was born in Paterson in 1857. Thirty years ago he entered the employ of the Rogers Locomotive Works, as an office boy. He rose to the presidency of the works and held it at the time that Jacob S. Rogers, the principal stockholder, gave the order to close down the works. When the present Rogers Locomotive Co. was formed Mr. Longbottom became associated with the American Locomotive Co. He is survived by a wife and five children.

SOCIETIES AND TECHNICAL SCHOOLS.

IRON & STEEL INSTITUTE OF GREAT BRITAIN.—The program for the annual meeting in this country has been arranged. It is expected that the members of the Institute will arrive October 21 to 23 and will remain in New York three days. Philadelphia and Washington will be visited. The three first days of November will be spent in Pittsburg, leaving there for Cleveland November 4. The reception committee consists of John Fritz, president; Charles Kirchhoff, chairman of the executive committee; Robert E. Jennings, treasurer and Theodore Dwight, secretary.

INDUSTRIAL.

The Denver Balance Co., of Denver, Colo., has recently filled an order for balances from Bolivia.

F. P. Burke, one of the old assayers of the Cripple Creek district, has disposed of his business, and will locate at Goldfield, Nevada.

The Mineral Products Manufacturing Co. has completed a large plant at C and Buttonwood streets, Wilmington, Del., where it is now to be addressed.

Thomas Fielding and J. Wilson Cary, of Denver, have formed a partnership and will carry on a mining machinery business under the old firm name of Thomas Fielding. Mr. Cary is a son of J. S. Cary, formerly of the Mine & Smelter Supply Co., and was connected with that firm for several years.

Recent Mexican orders taken or filled by the Allis-Chalmers Co. include: Compania Aviadora de Mina, operating La Natividad mine, two new sets of Allis-Chalmers mortars; the American-Mexican Mining & Development Co., a complete lead-silver smelting plant of a capacity of 100 tons a day: the Quintera Mining Co., a 60-ton copper smelting furnace; Charles Brandis, a 40-ton sectional dry-crushing cyanide and lixiviation plant.

The Gardner Electric Drill & Machinery Co., of Cleveland, O., in its Bulletin No. 1, states that it has secured the exclusive right to manufacture and sell the new Adams all-steel electric rock drill. This drill is stated never to require over 3 h. p. at the generator to operate it, and is not affected by high elevation nor very cold weather, as is an air-driven drill. It strikes about 600 blows per minute, does not require a flexible shaft, and is easy to transport.

By arrangement with Brown, Boveri & Co., of Baden, Switzerland, the Crocker-Wheeler Co., of Ampere, N. J., has secured their alternating current designs, patents and rights to manufacture in America, and has retained them as consulting engineers. The company is now putting on the market alternating current generators, transformers and accessories, adapted to American practice. A contract for a 200 k. w., 60-cycle, 440-volt alternating current generator has been closed.

Hadfield's Steel Foundry Co., Ltd., of Sheffield, England, has secured an important order for 10 of its largest size Heclon gyratory crushers from the Premier Transvaal Diamond Mines, Ltd. The crushers, which have a capacity of from 75 to 100 tons per hour, are to be used in breaking up the blue ground at the company's mines near Pretoria, preparatory to its going to the washing plant. The diamond washing plant that is being erected at this mine is the largest of its kind ever erected at one time.

TRADE CATALOGUES.

The Ingersoll-Sergeant Drill Co., of New York, has recently issued two unusually interesting catalogues. The first is Compressor Catalogue No. 35, and is remarkable for the excellent illustrations of the standard types of compressors made by the company. A picture of the new works at Phillipsburg, N. J., is shown for the first time in any of the company's catalogues. Pneumatic tool catalogue No. 5 shows the Haeseler air hammers and drill and a number of other labor-saving tools.

A condensed catalogue of air and gas compressors is being sent out by the Rand Drill Co., of New York, illustrating and describing some of the standard types for ordinary requirements. The styles include a cross-compound steam, condensing, with cross-compound air cylinders; those with single steam and single air cylinders, belt driven compressors, single and cross-compound. The booklet is supplied with comprehensive tables of the air capacities in cubic feet, the dimensions of air cylinders, length of stroke, horse-power, etc.

The Link Belt Engineering Co., of Philadelphia, Pa., has just issued a new edition of its catalogue of conveying machinery. This cloth-bound volume of 331 pages is of standard size, 6 by 9 in., and deals with modern methods as applied to elevating and conveying materials and transmitting power. It is well printed and contains a wealth of illustrations showing the many applications of conveying and elevating machinery at coal mines, cement works, ore mills, power stations, foundries, coal docks, etc. The devices shown include the Link Belt conveyor and the Ewart, Ley, '700 class' monobar and Dodge chain conveyors with tripping devices, buckets, conveyor flights, sprocket wheels, etc. Space forbids a more detailed notice of this catalogue, which should form part of the reference library of mining and mechanical enginers and of all men interested in handling materials cheaply.

GENERAL MINING NEWS.

ARIZONA.

COCHISE COUNTY.

(From Our Special Correspondent.)

The camp of Paradise is situated in the heart of the Chiricahua mountains, in the California mining district, about 40 miles north of the Mexican line. The nearest railroad station is Rodeo, N. M., just 15 miles southeast of the town. The mountains are thickly timbered and fairly watered, and were once the home of the Apaches. About 20 years ago the first prospecting was done with great difficulty and danger, owing to the Indians. The town of Gaylorville was started and several claims were worked, chiefly for the lead and silver. After 1893 the camp was abandoned, and lay dormant until a little over a year ago, when some prospectors came in and the result is a lively camp with good prospects. A year ago there was one tent and an old log cabin, with a few prospectors in the hills; to-day there are several stores, and 25 to 30 residences; the camp has a daily mail service. A survey has been made for a spur from Rodeo on the El Paso & Southwestern Railroad.

Chiricahua Development Co.—This company, at Paradise, has purchased the Burns group of 25 claims, which was owned by Thos. Burns and J. A. Duncan. The company has driven a cross-cut tunnel 750 ft., tapping the ledge at a depth of 280 ft. from the surface; from the floor of this cross-cut, a winze was sunk 100 ft. About 300 ft. east a permanent 3-compartment shaft is down 150 ft. The plant comprises two 150-h. p. boilers, a double drum hoist of 2,000 ft. capacity, a 20-drill (at this altitude) air compressor, pumps and other machinery. The property is about 1.5 miles west from Paradise. James H. Knowles, of Marquette, Mich., is manager, and Duluth and Marquette men, who are interested in the Calumet & Arizona mine of Bisbee, are stockholders.

Davis.—This group of 17 claims at Paradise has been bonded, but the details have not yet been given out.

Duluth & Chiricahua Development Co.—This concern acquired a large property at Paradise, and expects to begin work in about a month. Martin Pattison, Byron M. Pattison and Geo. H. Crosby, of Duluth, Minn., are stockholders. They have acquired the Shattuck property at Bisbee, and are now developing it.

Easter Sunday.—This claim at Bisbee, is shipping ore to El Paso.

Leadville.—This claim, at Paradise, is reported sold to some New York parties, $2,000 cash being paid on a price of $10,000, the balance on a time basis.

Saginaw Development Co.—This company has taken a bond on the World's Fair claims at Bisbee. The shaft is down 100 ft. F. L. Harrington is manager.

CALIFORNIA.

ALAMEDA COUNTY.

American Quicksilver Mining Co.—This company has been formed to develop a group of quicksilver claims back of Livermore, near the South Summit and Grayson ledges. A tunnel is to be driven from the west side of Red mountain. W. T. Jones, Jr., is superintendent.

AMADOR COUNTY.

Defender Mining Co.—This company's mine at Defender is being sunk to a lower level.

South Eureka.—The mill at this mine has undergone repairs and is ready to run again.

Zeila Mining Co.—At this mine at Jackson, W. F. Detert, manager, work is curtailed during a further sinking of the shaft.

CALAVERAS COUNTY.

Emery Gold Mining Company.—The dam of this company near El Dorado has broken, entailing considerable loss.

Gaston Hill.—A mill is being erected at this property near El Dorado.

Lloyd.—At this mine, San Andreas, a test run of the mill has been made; work has been temporarily suspended.

Midwinter.—A shaft will be sunk on this property at Hodson.

Ritter.—Considerable work is being done on this old mine at El Dorado.

Spinola.—This gravel mine at Central Hill, is being drifted to reach the channel. It is being operated by the Eagle Drug Co.

Summit View.—At this mine, Hodson, a 12-ft. vein has been struck and work has begun on a new working shaft. Hoisting engines and compressors are being installed and contracts have been let for a 10-stamp mill.

Union.—Arrangements are being made to work this mine at Copperopolis on a large scale. It belongs to the Ames estate of Boston, Mass., which owns three miles of mining ground along the lode.

What Cheer.—The mill site at this mine is being graded, and a mill for crushing gravel is to be put up.

EL DORADO COUNTY.

Eureka.—This old mine at Georgetown is being unwatered by the El Dorado Copper Mining Co.

Good Luck.—A. F. Leavitt has taken a bond and begun work on this mine near El Dorado.

Ida Mitchell.—This mine, at Placerville, has reached the 300-ft. level on a ledge 32 ft. wide. A. M. McDonald has recently been appointed superintendent.

Jasper.—In this property, near Rescue, a vein of high-grade ore has been struck.

Karolyi.—At this mine, near Kelsey, formerly the Lady Emma, a good pocket in the Hayden shoot has been found. A 2-stamp mill for testing has been put up.

Leavitt.—A large ledge has been uncovered in this mine near Kelsey.

Pyramid.—At this mine, Webber Creek district, the shaft is being sunk from the 300 to the 400-ft. level. Good ore was struck on the 300-ft. level.

Red Raven Mining Co.—This company has begun work at its mine at Shingle Springs.

Rio Vista Copper.—A 500-ft. shaft will be sunk at this mine.

Robles Grand.—This mine, near Coloma, has been bonded to W. T. Shurtleff and others, and a double compartment shaft is being sunk. A steam hoist has been installed.

Wagner,—At this mine, near Lotus, under bond to W. F. Shurtleff, a double compartment shaft is being sunk and a steam pump and hoist are to be installed.

INYO COUNTY.

Cactus Flat District.—A vein carrying high grade ore is reported struck here. The Forgot and Ella Benson mines are both yielding good ore.

Funeral Range.—Capt. J. R. DeLamar has shipped machinery to new claims in this district which he recently bought from Keane & Farron. The first payment of $10,000 on the bond has been made.

KERN COUNTY.

Butte Lode.—The clean-up from the June run of this mine at Randsburg amounted to $76.66 per ton.

NEVADA COUNTY.

Blue Hill.—The machinery from the American Hill mine is being moved to this mine, at Willow Valley.

Central Consolidated.—A second payment of $5,000 has been made on this property.

Charronat Group.—The shaft of this mine is to be retimbered, and the hoisting works are being remodelled.

Conlin.—An ore body has been uncovered in this mine. The ledge was cut in a cross-cut from the 300-ft. level.

Conlin.—A very good body of ore is reported found at the point where the ledge was struck in this mine at Grass Valley.

El Oro.—Work has been resumed on this mine at Maybert, W. M. Wilson, superintendent, and the workings are being unwatered.

Federal Loan.—A pipe line has been put in at this mine. L. A. Sutherland is superintendent.

SANTA BARBARA COUNTY.

Casmalia Beach Mining Co.—At this company's camp, near the ocean beach, seven miles southeast af Casmalia, the sand and water are carried through five special amalgamators, the gold found in the sands being fine.

SHASTA COUNTY.

Clover Creek Quicksilver Mining Co.—This new company, H. S. Wilson, manager, which has acquired the old Modoc Chief property, will at once start development.

Crown Deep.—A fire at this mine, Lower Springs district, destroyed the assay office and superintendent's dwelling.

Gambrinus.—The California & Montana Mining Co., which recently bought this mine, at Whisky Gulch, has put in a small mill, and a compressor plant is to be installed.

Mountain Copper Co.—This company, at Keswick, Lewis T. Wright, general manager, has materially reduced its force at mine and smelters. Acid works on the shore of San Francisco bay have been purchased, and sulphuric acid will be made from the Iron mountain pyrites.

SIERRA COUNTY.

Columbia Gravel.—At this mine, American Hill, the tunnel will be extended.

Mabel Mertz.—Fine wash gravel has been struck in this mine on the west rim of the channel.

Mexican.—This mine on the South fork near Downieville has been bonded by H. B. Tiedemann, of San Francisco. There are four locations on the property, and work will begin at once.

Poor Boy.—This mine, near Scales, has been bonded to T. A. Patterson, Jr., who has begun operations. Andrew Fitzgerald is superintendent.

Steamboat.—At this mine, Chipps Flat, a new company represented by J. W. Morrell has taken charge.

Steamboat.—This mine has been bonded to the Alleghany Co., whose property it adjoins.

Tightner.—The strike in this mine near Alleghany still holds out, and the ore seems to be increasing in richness. It is owned by C. and J. Binning, J. McCormick and G. W. Hildebrand, of Alleghany.

West Point.—At this mine, Port Wine, two shifts of men have started work on the tunnel.

White Bear.—A rich strike has been made in this mine, 9 miles from Downieville. Good gravel has been found in the upraise from the tunnel.

SISKIYOU COUNTY.

Blue Lead Copper Mines.—The deal for these mines with Eastern men has been finally closed. The price is said to be $175,000.

Columbia and Golden Eagle.—Work is to be resumed on these mines in Scott river district by Thos. A. Fisher, the owner.

Headwater.—This company is shipping sulphide ore from Humbug via Yreka to the Keswick smelters.

Morrison & Carlock.—Machinery is arriving at this mine at Quartz Valley. An electric lighting plant has been put in for mine and mill. Two 5-stamp batteries are being added to the mill, and new air compressor and an air drill outfit have been provided. J. M. Morrison is superintendent.

McKinley.—At this mine on Humbug it is reported that a new shaft is to be sunk.

Phillips.—This mine on Canal gulch, sometimes known as the Red Hill, has been purchased by Geo. V. Gray. There is a shaft 120 ft. deep.

SONOMA COUNTY.

Roblar Mine.—At this property, Stony Point, J. W. King, superintendent, the second shaft is down 50 ft. in a body of loose, white rock.

TRINITY COUNTY.

Yellow Rose of Texas.—The ledge has been struck 950 ft. in from the portal of the lower tunnel of this mine at Carrville, at a depth of 350 ft. The ledge is 8 ft. wide, averaging $12 per ton.

TUOLUMNE COUNTY.

Two and one-half miles of gravel mining land, near Smartsville, from Mooney flat to the Yuba river, and including the mineral rights of the Excelsior Water Co., have been secured by a company of which C. H. Hill, of Los Angeles, is the head.

App.—It is reported that a 12-ft. vein of rich ore has been found on the 1,300-ft. level of this mine. W. A. Nevills is owner.

Big Casino Mining Co.—This company, at Big Oak Flat, Richard O'Brien, superintendent, is milling good ore from the Mack mine. The 20-stamp mill is running full time and 60 men are employed.

Dutch.—At this mine, near Jamestown, the concentrating plant is to be stopped, and all tailings will go direct from the batteries to the cyaniding plant, by which a saving of from $20 to $30 per day is expected.

COLORADO.

BOULDER COUNTY.

Nellie Bly.—This mill at this mine at Magnolia has resumed operations after an idleness of several years. It is owned by the Magnolia Milling & Mining Co. Will Davis is superintendent.

Sugar Loaf Mining & Reduction Co.—A 25-stamp mill is to be built at the Golden Age No. 2 property of this company at Sugar Loaf.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Gilpin Ore Shipments.—The shipments of smelting and crude ores, tailings and concentrates from the Black Hawk depot to the Denver smelters and to outside points of treatment during June were 252 cars, or 5,040 tons, an increase of 30 cars, or 600 tons, over the previous month and the heaviest record of the year.

Boss.—A three years' lease and option on this group of three claims in the Fairfield district, has been given by N. D. Owen and others to the Mascot Mining, Milling and Tunnel Co., and operations have been begun.

Cashier Gold Mining & Reduction Co.—A shipment of smelting ores from the 600-ft. workings gave values of 13.55 oz. gold, 13.45 oz. silver, and 14.60% in copper, or net values of $288 per ton.

Delmonico Gold Mining Co.—Sinking has been suspended for the present, with the shaft down nearly 1,450 ft. Ores are being taken from the 1,400, 1,200 and 600-ft. levels, and about 30 tons are being handled daily in the Montgomery concentrating plant.

Gold Dirt Mining Co.—This company has begun to ship smelting ores over the Moffat road to the Denver smelters, loading the ores at Rollinsville, and intends to ship about 10 tons per day, taking out only the ores which cannot be sorted in the mine, and leaving the milling ores, except what must be stored in bins on surface, until it erects a milling plant in Gambell gulch. The pay roll will be increased. W. H. Knowles, Rollinsville, is manager.

Gulch.—A 50-h. p. engine and 70-h. p. boiler have been installed at this property, and a large shaft building is in course of erection. The shaft is about 300 ft. deep. W. Mitchell & Sons, Central City, are owners and operators.

Grizzly.—This property at Russell Gulch is being started up by local people as lessees. A plant of machinery will be installed. M. A. Harris, Russell Gulch, will be in charge.

Hall.—A six months' option has been given on this property in Russell district to G. Whitney, of Black Hawk. The option calls for the payment of $12,000 at the end of six months.

Hidee Gold Mining Co.—A shipment from the 280-ft. level brought net values of 6 oz. gold, 9 oz. silver and 11% copper, or net values of $136 per ton at sampling works. Manager Flinspach leaves this week for St. Joseph, Mo., to consult with stockholders on sinking a new shaft to open the property more advantageously.

Kansas-Burroughs Consolidated Co.—The production for June was 145 cars or 1,235 tons, most of which went to the stamp-mills and concentrators; the balance to the smelting plants. R. Sykes, Central City, is manager.

Lillian.—This property is being developed and has produced good smelting and concentrating ores. E. S. Giles, Idaho Springs, is manager.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

Leadville Ore Production.—For June the output was 66,000 tons of all classes of ore, a slight falling off compared with May, due to the smelters curtailing iron shipments. The amount of zinc shipped reached 8,000 tons.

Blue Ribbon.—This shaft, in South Evans gulch has been unwatered, and drifting has started from the bottom to the ore body. The property is under lease to Bolan & Krommer.

Favorite.—Another shaft is being sunk in the gulch, north of the Izard; from the old shaft ore is being shipped steadily.

Mosquito Range.—A tunnel started at the junction of north and south Mosquito gulches will be driven west, to cut the London mine at a depth of 1,500 ft. New York men are interested.

Ollie Reed.—The ore shipped is a lead sulphide, carrying excellent values in gold. The company has secured the Howard ground on the flat below the Ollie Reed; the boilers are in place, and when the hoist arrives sinking will start.

Pride of the West.—This shaft has reached the level of the Harvard, and will be sunk about 100 ft. deeper to catch the ore body. Shipments from the other properties owned by the Fryer Hill Mines Co., continue steady.

Rattling Jack.—A good body of ore has been opened, that runs $30 per ton, principally in gold. The property adjoins the Little Johnny.

Ready Cash.—A new plant of machinery is being installed at this mine, Iowa gulch.

Resurrection.—The new ditch from the head of Evans gulch, which will carry water directly to the mill, is nearing completion. The mine is turning out about 150 tons daily of crude ore, while the mill is handling 100 tons daily of good concentrates.

Resurrection.—After being shut down for several months the mill on this property is running full time, turning out 100 tons of concentrates in 24 hours. The mine is shipping about 75 tons of crude ore daily.

MINERAL COUNTY.

Humphreys.—The third Chilean mill has been installed at this mine at Creede.

Mustang.—The vein recently cut on this property at Creede is reported to show good silver ore.

OURAY COUNTY.

American Gold Mining Co.—At a recent meeting of the stockholders at Ouray, it was voted to reduce the par value of the stock from $10 to $1, and increase the number of shares from 300,000 to 600,000, making the capitalization $600,000 instead of $3,000,000, and giving 300,000 shares of treasury stock. It is expected the treasury stock will be sold to raise money for improving the mill at the American Nettie mine.

Ouray Smelter.—This plant at Ouray has resumed operations. Over 2,000 tons of ore are in the bins awaiting treatment.

Red Mountain Reduction, Mining & Smelting Co.—This company, at Ouray, has placed an order for a $20,000 plant of machinery, which will be installed at the mouth of the new tunnel which is to unwater the Guston, Yankee Girl and adjacent territory.

SAN MIGUEL COUNTY.

(*From Our Special Correspondent.*)

Alta Mines Co.—The Alta group and the mill, in Gold King basin, are running steadily. The mill, with a capacity of 100 tons daily, is crowded with ore, and turns out almost 2 carloads of concentrates, running in gold, silver and lead, every 24 hours. This product, as well as high-grade ore shipped, is packed to Ophir station. The ore coming from No. 6 level is reported the richest yet taken from the mine. A. C. Koch, of Telluride, is resident manager.

Butterfly-Terrible Gold Mining Co.—This company's large group of mines and its 30-stamp mill, near Ophir station, is making the best record in their history. The ore comes from a shoot 750 ft. long by 320 high between the first and third levels, and is reported to be the richest ever taken from the property, yielding from $10 to $25 to the ton in gold; the mill is handling from 75 to 100 tons in 24 hours. The company contemplates starting a cross-cut tunnel almost on a level with the mill, to intersect the vein about 800 ft. below No. 3 level. J. F. Keating, of Ames, is resident manager.

Carbonero.—This group of patented claims, near Ophir, belonging to H. H. Stevens, of Colorado Springs, and partners, was worked steadily through the winter. A carload of ore shipped to the Durango smelter last week netted $65 per ton. The ore carried 106 oz. silver and 34.5% lead. Part of the group is worked on lease.

TELLER COUNTY.

(*From Our Special Correspondent.*)

Anaconda.—A cyanide mill is being installed to treat a number of dumps.

Findley Gold Mining Co.—It is rumored that a consolidation of this company's property with the Shurtloff No. 2 claim will soon take place. The two properties are controlled by A. E. Carleton and associates and adjoin each other. Both are producing a large amount of ore. J. S. Murphy, of Cripple Creek, is in charge of the Findley and L. G. Carleton, of the same place, is superintendent of the Shurtloff.

Mint Consolidated.—The property of this company on Gold Hill has been leased to W. B. Pullen, who will do considerable development work. Considerable ore has been shipped from the property.

W. P. H.—Considerable ore is being shipped; it is not of remarkably high grade, but runs well and nets a good profit for the lessees.

Wild Horse.—The cyanide mill is nearing completion. The ore is friable and well oxidized. E. H. Asmussen and associates, of Cripple Creek, have a lease on the property.

IDAHO.

BLAINE COUNTY.

Boyle Mountain Mining & Development Co.—The property of this company at Hailey, includes 11 patented claims. The adit to cut the Sunday vein is in about 500 feet.

Guggenheim Exploration Co.—The lower tunnel operating Boyle mountain at the property at Hailey, held by this company under bond and lease, is in a vein carrying 10 ft. of zinc-lead-silver ore.

Twentieth Century Mining & Power Co., Ltd.—This company is adding to its outfit a sectional 10-stamp gold mill of Allis-Chalmers make, with a crusher and other accessories.

LEMHI COUNTY.

(*From Our Special Correspondent.*)

Pacific Dredge Co.—This Chicago company, working an electric dredge on Moose Creek, 16 miles west of Salmon, has a crew of 14 men on the pay roll. This is the third summer the present boat has operated. The officers are: W. W. Tracy, president; J. F. Rodes, vice-president; J. S. Butler, secretary, and E. W. Gillett, treasurer, all of Chicago.

Prairie Basin Opal Mines, B. E. Rose, manager, has left Salmon for Forney, near these mines, to start work for the summer. The mines are 50 miles west of Salmon.

Salmon Gold Mining Co.—This Philadelphia, Pa., company has two large giants piping gravel at Bohannon bar, eight miles east of Salmon. The concern has operated the diggings several years as a close corporation at a big profit. Eighteen miners are employed, and the placer season generally runs to the middle of September.

ILLINOIS.

SANGAMON COUNTY.

(*From Our Special Correspondent.*)

Springfield Co-operative Coal Co.—This company has shut down its mine for two months for repairs and improvements. It is rebuilding the hoisting tower and is going to put in self-dumping cages and a new electrically driven fan at the escapement shaft.

Williamsville Coal Co.—This company has shut down its mine at Selbytown, on the Chicago & Alton Railway, for the summer, and is rebuilding the tower and tipple and will put in shaker screens.

LOUISIANA.

ACADIA PARISH.

(*From Our Special Correspondent.*)

The Crowley Oil & Mineral Co.'s well No. 13, at Crowley, is in, but it adds no territory to the proven field. The Morse Oil Co. has purchased two acres of land and will drill two wells. The Tierce Oil Co. has let contracts for three wells. The Morse Oil Co. No. 5 and the Getty-Bothbotham wells have been brought in and are producing well.

CALCASIEU PARISH.

(*From Our Special Correspondent.*)

The Colorado-Texas Co.'s well at Welsh is down 2,000 ft.; no other development is under way and the output of crude is still small.

PLAQUEMINES PARISH.

(*From Our Special Correspondent.*)

The Leovy estate is drilling a well at Buras, which is now down 1,800 ft.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(*From Our Special Correspondent.*)

Atlantic.—The June production was 205 3-5 tons of mineral. Work was resumed June 6, after two weeks' idleness, caused by the trammers' strike. (Several trammers are under arrest.) Rock shipments are at the rate of 1,400 tons per day.

Baltic.—This mine produced 797 tons of mineral in June.

Calumet & Hecla.—It is reported that work at No. 13 shaft on the Osceola amygdaloid lode will be resumed soon. Twelve drills will be placed in commission. No work has been done for four years, and it is said to be the purpose of the management to test the lode.

Calumet & Hecla.—The June output is estimated at 3,250 tons of refined copper.

Centennial.—Shipments of rock to the mill at Grosse Point began this week and one head will be operated regularly.

Champion.—Development work continues on a large scale, 53 drills being in commission.

Champion.—Excavating for a 2-head addition to the stamp mill is well under way. The output in June was 715 tons of mineral.

Copper Range Consolidated.—President William A. Paine, of Boston, and S. L. Smith, of Detroit, a director, are inspecting the various properties of this company.

Copper Range Railroad.—At the annual meeting of the stockholders in Houghton the old board of directors was re-elected. The following directors made a trip of inspection over the road: William A. Paine, of Boston; John H. Rice, Rufus R. Goodell and R. T. McKeever, of Houghton; James H. Seeger, of Hancock; Samuel L. Smith, of Detroit, and Frank McM. Stanton, of the Atlantic mine.

Elm River.—Drifting on the Winona lode continues and occasionally good ground is opened.

Franklin.—The June production was 356 tons of mineral. The new shaft at the Junior branch has commenced shipping.

Franklin.—Shipments of rock from the new No. 2 shaft at the Junior branch of this mine has begun. The fourth head at the mill will be operated intermittently until the openings are more extensive.

Isle Royale.—The June product was 100 tons of refined copper. Test-pitting on section 11 on the amygdaloid lode has been suspended. A boiler, hoist and derrick will be installed and an exploratory shaft sunk.

Michigan Smelting Co.—A strong retaining wall is being built to prevent a weakening of the foundation of the drying plant, sampling mill and other portions of the smelter.

Osceola Consolidated.—The June production is estimated at 912 tons of refined copper. Captain Thomas Rapson, formerly superintendent of the Miskwabik Development Association, has been appointed assistant head mining captain of the North Kearsarge branch.

COPPER—KEWEENAW COUNTY.

(*From Our Special Correspondent.*)

Ahmeek.—This mine produced 25 tons of refined copper in June. Shipments are irregular, one head at the Tamarack stamp mill on Torch lake being used part of the time.

Mohawk.—The output in June was 479 tons of mineral. Additional drills have been placed underground and rock shipments average 1,500 tons per day. In June the average refined copper per yield per ton of rock stamped was 18½ lbs. All mineral is now sent to the Michigan smelter for treatment, the contract with the Lake Superior Smelting Co. having expired July 1.

Phoenix Consolidated.—The work of rebuilding the shaft house at the West vein shaft which was destroyed by fire, is progressing rapidly, and the structure will be completed in a short time. A large amount of mass copper, many pieces weighing 500 to 1,500 lb. each, has been taken out of the St. Clair shaft. This heavy copper is teamed to Calumet, and from there shipped over the Copper Range railroad to Houghton, then transferred to vessels for shipment down the lakes. It is purchased by the American Metal Co., of New York.

Phoenix Consolidated.—The June product was 110½ tons of mineral.

COPPER—ONTONAGON COUNTY.

(*From Our Special Correspondent.*)

Adventure Consolidated.—The June production is estimated at 60 tons of refined copper.

Mass Consolidated.—This mine produced 127½ tons of refined copper in June.

Michigan.—The June production was 115 tons of refined copper.

MINNESOTA.

IRON—GOGEBIC RANGE.

Brotherton.—This mine at Sunday Lake, is running full force and making heavy shipments.

IRON MENOMINEE RANGE.

Higgins.—This mine, of the Chemung purchase, is being prepared for stripping for a milling pit is going on day and night. The mine is already equipped with machinery but will probably not mine much this year.

Interstate Iron Co.—This company's Grant mine, which has a considerable stock of the ore mined last year, will be opened this year enough to clean out the stocked ore.

Kinney.—This mine, of the Republic Iron & Steel Co., has resumed work, after a close of two weeks.

Oliver Mining Co.—This company has taken a lease on the McGillis property at Stambaugh, and will begin development work at once.

Richmond.—This mine in the Cascade district, is expected to resume operations shortly.

Riverton.—This mine near Iron River, which has been idle for some time, will soon resume operations.

State Mines.—The State of Minnesota has placed a man at the Pool mine, which it owns, to check shipments. This is the only State mine that will do much in 1904, as the Grant is idle, the Minnewas is dismantled and has been for 10 years; the Oliver will ship only its minimum of 5,000 tons, and the Elizabeth is idle after having sent out a trial cargo.

IRON—MESABI RANGE.

(*From Our Special Correspondent.*)

Nothing has been determined as to stripping operations at the Grant mine, of the Interstate Mining Co., though it has been looked over this week with the idea in view. Contracting firms have put in bids, and it is quite probable that the work may be undertaken in time to mine the open pit another year, or in 1906. The job will be a large one, as there is ore clear across a 40-acre tract, and at depths from 40 ft. to greater.

Shenango mine, of the Shenango Furnace Co., has been preparing for mining operations for the past three years, and is now about ready to begin. It has been bothered successively by quicksands and by water, and the opening of the mine has been excessively expensive and slow. It has already paid three years of royalty minimums, of $20,000 per annum, and it is hoped to get out nearly one year's minimum this season.

Tesora Mining Co.—This company will strip about 100,000 yards more from its Forest mine, near Stevenson, during the summer. So far 65,000 yards have been stripped by the Wallace Contracting Co., which has the contract for the entire work. The mine is a small one, but contains excellent ore.

Winnifred Mining Co.—The company is shipping from its Winnifred & Sarnia mines a total of about 1,000 tons daily, and will increase this total if certain expected sales are made.

IRON—VERMILION RANGE.

(*From Our Special Correspondent.*)

The Oliver Iron Mining Co.—This company's mines are all sending out a large tonnage from underground and from stockpiles. Five shovels are in stock, loading cars, and a full force is busy at all the mines. B shaft, Pioneer mine, which has been under construction for four years, is about ready, and the final details of equipment are being placed. A steel shaft house, 160 ft. high, is under construction by the American Bridge Company.

MONTANA.

DEERLODGE COUNTY.

Indian Queen.—Negotiations for the purchase of this mine have been declared off; the present owners, it is reported, will organize, and work the property.

JEFFERSON COUNTY.

(*From Our Special Correspondent.*)

Corbin District.—The Copper Mountain Mining Co. and the New York & Montana Cop-

per Co. are sinking between them three shafts, each to be sunk 500 ft. before cross-cutting will start. Wm. Flint, of Duluth, representing Minnesota men, has just completed a geological map of the district covering a section of country four miles long by two miles wide. This map is preparatory to a systematic exploration of the section covered by deep diamond borings.

Midas Gold Dredging Co.—This new company is to build a dredge on Clancy creek, eight miles west of Clancy. The incorporators are C. S. Crysler, D. M. Crysler and G. H. Stephenson, all of Helena; J. P. Barns, of Lewistown, Mont., and H. B. Galligan, of Smartville, Cal. The dredge will operate the old Leman diggings, now owned by Barnes & Stewart.

MADISON COUNTY.

Gold Hill.—This mine has been purchased by C. L. Higgins, of Montreal. The reported price is $40,000.

NEVADA.

LINCOLN COUNTY.

Pioche-Nevada Mining Co.—At this group of claims, near Pioche, a 6-ft. body of lead carbonate is reported opened.

LYON COUNTY.

Crabb.—A small stamp mill is being installed at this mine, south of Yerrington.

NYE COUNTY.

Jim Butler Mining Co.—This company has purchased the Stone Cabin and Wandering Boy claims at Tonopah.

NEW MEXICO.

RIO ARRIBA COUNTY.

Buckthorn.—At this mine in the Bromide district drifting is being done on a vein 3 ft. wide.

SAN MIGUEL COUNTY.

Blake Mining, Milling & Investment Co.—This company has purchased the copper reduction mill of J. L. Matt, at Las Vegas, and will remove it to its properties at the Tres Hermanos mines, near Bernal.

SOCORRO COUNTY.

Dividend Mining Co.—Development work on Colorado mines No. 1, 2, 3 and 4, at Estey City, owned by this company, is being pushed. The ore is a carbonate and will be treated by leaching and precipitation. The mill is nearing completion.

PENNSYLVANIA.

ANTHRACITE COAL.

Bear Valley.—A new shaft is being sunk at this colliery in the Shamokin region. The total depth will be 1,200 ft.

Delaware, Lackawanna & Western Coal Co.—The Truesdale shafts north of Nanticoke are down 1,000 ft., and will be sunk to 1,500 ft. Six veins of coal will be worked. An electrically equipped breaker is in course of construction.

Greenwood.—The Lehigh Coal & Navigation Co. is reported ready to extinguish the fire which has been burning at this mine at Temaqua for 50 years. It is expected that two years' time will needed to put out the fire.

Philadelphia & Reading Coal Co.—The Mammoth No. 9 vein has been reached by tunneling at the Burnside colliery of this company at Burnside. The breaker, which when built was too large for the original needs of the colliery, can now be operated at full capacity.

Potts.—The fire in the bottom lift of this colliery at Locust Dale has been extinguished. Repair work will begin at once.

BITUMINOUS COAL.

Morrisdale Coal Co.—The mines of this company in the Broadtop region have resumed operations after an idleness of several months.

Loyalhanna Coal & Coke Co.—The collapse of two large water tanks at this company's Pandora mine at Latrobe on July 6 has compelled a suspension of operations.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

Iron Hill Mining Co.—At the annual election of this company, these officers were elected: Otto P. Th. Grantz, Deadwood, president; H. T. Cooper, Deadwood, vice-president; George F. Baggaley, Deadwood, secretary and treasurer. The company's property is in Carbonate Camp.

Golden Elk Mining Co.—This company has been organized, with 2,000,000 shares, to open 1,000 acres of ground in the Bear Gulch district. The incorporators are E. B. Sager, Lute Dickinson and Burt Mills, of Bear gulch. The ground adjoins the Tinton property.

Hidden Fortune.—This mill, in Deadwood, has resumed operations for the first time since the freshet.

Hidden Fortune Mining Co.—H. J. Mayham has denied the report that he sold his stock in this company and was practically out of the management. He has not sold, but has been purchasing stock.

Hiaden Treasure.—A vein of ore is reported cut in this mine, west of Deadwood. Machinery is being installed for a hoisting plant.

Lucky Strike.—The shaft at this mine will be sunk 200 ft., and plans for a 60-ton mill have been made.

Michigan Gold Mining Co.—At the annual meeting of this company, J. B. Mars, Deadwood, was elected president; Edward Hanschka, Deadwood, vice-president; John Baker, Deadwood, secretary and treasurer.

Morning Glory Mining Co.—A vertical vein of silicious ore has been encountered on this company's property west of Ragged Top.

Omaha Mining Co.—Machinery has arrived for a hoisting plant for this company, in the Garden City district. A shaft is being sunk.

Oro Hondo Mining Co.—This company has elected the following officers: B. H. Tatem, Helena, Mont., president; George M. Nix, Denver, vice-president; W. A. Mears, Philadelphia, secretary and treasurer; W. A. Tatem, Helena, Mont., assistant secretary and treasurer. The collar of the shaft at this property is 300 ft. below the top of the deepest Homestake shaft, making it several hundred feet lower in the formation than any of the Homestake workings.

Ruby Gold Mining Co.—At the annual meeting of this company these officers were elected: James Conzett, Deadwood, president and treasurer; B. F. Butler, Newcastle, Pa., vice-president; N. T. Mason, Deadwood, secretary. The company is operating a 40-ton mill at Galena.

Safe Investment.—The 400-ft. tunnel at this mine is being enlarged for two tracks. A 500-ft. shaft will be sunk.

Spearfish Co.—A new shoot of ore has been opened on this property in Ragged Top.

Wasp No. 2.—The monthly dividend has been declared, amounting to 3% a share, or $5,000. It is reported that the Venture corporation will take up this and adjoining properties the first of August.

Wauconda.—A new steam hoist has been purchased for this mine. The shaft will be sunk 500 ft. At the shaft bottom a vein 40 ft. wide was cross-cut. Frank Ames, of Deadwood, is superintendent.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

Black Hills-Anaconda Mining & Milling Co.—This company, at Hill City, has been organized with 1,500,000 shares of stock. A shaft has been sunk 100 ft. and a cross-cut driven 100 ft. east and west. A 50-ton Lane mill will be built this season. G. A. Karr is general manager.

Elmendorf Gold Mining Co.—Work is to be resumed by this company on its property north of Keystone.

TEXAS.

HARDIN COUNTY.

(*From Our Special Correspondent.*)

Batson's Oil Field.—New wells in are those of the Higgins Oil & Fuel Co., Charles Little and the Texas Co. No. 2 well.

JEFFERSON COUNTY.

(*From Our Special Correspondent.*)

Beaumont Oil Field.—One of the Cincinnati-Beaumont wells in the Hogg-Swayne tract is being cleaned out; if it can be made a producer again other wells will receive attention. Many operators are investigating desirable locations for wildcat wells; one will be drilled on Bayou, and one on the Brigham-Hildebrand farm. The Texas Co. has made the following reduction in pipe-line charges: Sour Lake to Beaumont, from 10@6c.; Boston and Saratoga, to Port Arthur, from 25@15c.; Sour Lake to Port Arthur, from 20@12c.; Beaumont to Port Arthur, from 10@6c.; Batson's to Saratoga, from 10@5c.

Production is about stationary, and producers are holding for better prices. Demand is slow and prices weaker at 45@47c. per bbl.

LIBERTY COUNTY.

(*From Our Special Correspondent.*)

The Peppercorn well at Dayton, situate four miles north, has been abandoned and Anderson Brothers, the owners, will drill another wildcat on the Haggerty survey.

SAN AUGUSTINE COUNTY.

(*From Our Special Correspondent.*)

The Guffey Petroleum Co. well, 4 miles north of San Augustine, is down 700 ft.; another well will be drilled six miles south of town.

UTAH.

CARBON COUNTY.

(*From Our Special Correspondent.*)

Acme Ozocerite Wax Co.—The incorporators of this $200,000 company are G. F. Culmer, of Chicago; H. C. Bailey, of Akron, O.; H. L. A. Culmer, G. C. K. Culmer and H. H. Culmer, of Salt Lake. The company is organized to mine and manufacture mineral wax, ozocerite and other hydro-carbons.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

Bingham Consolidated Smelter.—From this plant, during the week ending July 2, 243,618 lb. of copper bullion were shipped.

Bingham Consolidated Smelter.—For the week ending July 9 copper bullion shipments aggregated 244,230 pounds.

Columbus Consolidated.—The electric power plant, built at a cost of about $40,000, is in commission. The construction of the 100-ton concentrating mill is progressing, and the mill should be ready September 15.

Ore and Bullion.—Salt Lake banks reported settlements to the amount of $373,000 during the fiscal week ending July 8.

South Columbus.—Ingersoll-Sergeant drills have been installed at this Alta property and work in the main tunnel is proceeding rapidly. It will cut an ore body within 300 ft.

United States Smelter.—The shipments of copper bullion aggregated 255,416 lb. during the week ending July 2.

Utah Consolidated Smelter.—The shipments of copper bullion during the week ending July 2 aggregated 302,429 lb. The enlarged plant has gone into commission, and the mine at Bingham will have to supply 800 tons of ore daily.

Utah Copper Co.—Manager D. C. Jackling has announced that immediate steps will be taken to enlarge the company's mill at Bingham. A 300-ft. addition to the present building is to be constructed, which will provide room for 32 Frue vanners.

Wheeler & Wilson.—This property, in Big Cottonwood district, is to be reorganized under the name of the Kessler's Peak Mining Co., with a capital of 500,000 shares of the par value of $1. Chicago capital is interested and preparations are being made to drive a 1,000-ft. tunnel to cut at 2,000-ft depth the ore bodies exposed in the upper workings. The company expects to equip the property with machine drills, compressor, etc. W. F. Gray, of Salt Lake, is manager.

SEVIER COUNTY.

(*From Our Special Correspondent.*)

Sevier Consolidated.—At the annual meeting at Ogden these officers were elected: Seymour

W. Tullock, Washington, D. C., president; Rev. William E. Mason, Ogden, Utah, vice-president; Capt. H. C. Lawrence, Denver, manager; these with Edgar Thornton and Thomas Arbon, of Ogden, are directors. The company's mine and mill were reported in excellent shape. The mill is about to go in commission.

WYOMING.

BIG HORN COUNTY.

Galena Ridge Mining Co.—This company, with a capital of $500,000, has been formed by South Dakota men to work 1,000 acres of land on Wood river.

FOREIGN MINING NEWS.

AUSTRALIA.

WESTERN AUSTRALIA.

The gold production reported for the month of June was 200,357 oz. bullion, a decrease of 7,702 oz. from June, 1903. For the six months ending June 30, the total output was 1,178,136 oz. bullion, against 1,221,759 oz. in the first half of 1903, showing a decrease of 43,623 oz. The bullion reported this year was equal to 983,375 oz. fine gold, or $20,326,357 in value.

CANADA.

BRITISH COLUMBIA-BOUNDARY DISTRICT.

Boundary Ore Shipments.—The shipments for the week ending July 2 were as follows: Granby, 12,180 tons; Mother Lode, 2,848 tons; Emma, 1,023 tons; No. 37, 132 tons. Total for the week, 16,546 tons. Total for the year to date, 413,007 tons.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—The shipments for the week ending July 2 were as follows in tons: Le Roi, 1,470; Centre Star, 1,350; War Eagle, 900; Le Roi Two, 300; Le Roi Two (Elmore), 250; Spitzee, 30; Kootenay, 395; Jumbo, 120; Iron Mask, 70. Total, 4,885. Total for the year, 182,413 tons.

NOVA SCOTIA—CAPE BRETON.

Dominion Coal Co.—The output of coal for the first six months of 1904 was 1,505,781 tons, compared with 1,617,278 tons for the same period of 1903.

NEW CALEDONIA.

Shipments of ores for April and the four months ending April 30, are reported by the *Bulletin du Commerce*, of Noumea, as follows, in metric tons:

	April.	Four months.
Nickel ore	.....	16,693
Cobalt ore	450	1,285
Chrome ore	120	12,255

The shipments direct to the United States were reported in April.

NEW ZEALAND.

Exports of gold and silver are reported by the Mines Department as follows in ounces, for April and the four months ending April 30:

	Gold		Silver	
	1903.	1904.	1903.	1904.
April	29,647	24,959	70,053	71,110
Four months	147,599	150,042	279,105	276,305

For the four months there was an increase of 2,443 oz. gold, and a decrease of 2,800 oz., silver. The gold bullion reported this year was equal to 134,618 oz. fine gold, or $2,782,750 in value.

SOUTH AMERICA.

BRITISH GUIANA.

Exports of gold from the colony for the six months ending June 30, were 36,272 oz., against 40,482 oz. in the first half of 1903; a decrease of 4,210 oz., or 10%, this year.

Exports of diamonds were 4,890 carats, valued at $39,790, against 4,139 carats, valued at $35,957 in 1903; showing an increase of 751 carats, and $3,833 in value.

MINING STOCKS.

(Full quotations given on pages 87 and 88.)

New York. July 13.

Quotations for the higher priced mining shares show fractional gains, but trading, though a little better than last week, does not indicate that the public are important investors. In fact, the advances made are in shares whose supporters appear untiring in their zeal to initiate a revival. Amalgamated Copper, in nearly doubling its daily transactions, has risen from $50.50 to $52, but with every fractional advance more stock is offered. Anaconda did a little business around $18.50. Greene Consolidated, of Mexico, was called in a moderate way by curb brokers, who bid the price up to $15.25 on match orders. White Knob, of Idaho, has been tossed by professional traders who tried to make capital out of the knowledge that the company borrowed $400,000, giving as collateral its 6% bonds. For several days White Knob moved between $4 and $5, but at the opening of this week rallied to $5.50 on fair sales. British Columbia is pivoted at $2.50.

American Smelting & Refining shares were in moderate request, the common bringing $54.25@$54.625 and the preferred $97. On July 6 the employees' dividend, amounting to $90,000, was paid. This dividend is the first of its kind and will be paid whenever the earnings of the company are large enough to meet regular expenses, including the stock dividends, and leave a satisfactory surplus.

The gold and silver shares are quiet. In the Colorado section Elkton Consolidated, of Cripple Creek, holds at 66@67c. The Comstock shares continue weak, Consolidated California & Virginia selling at $1.10, Mexican at $1.05 and Hale & Norcross at 72c., while Ophir, which has paid its seventh monthly dividend, is invisible.

Phoenix, of Arizona, shows continued strength, and this week was sent up to 30c., a gain of 9c, per share. Evidently its supporters are working to send the price to par.

The July semi-annual dividend of 3½% ($347,165) on the preferred stock of the Monongahela River Consolidated Coal & Coke Co. will be passed owing to heavy losses in earnings as a result of river accidents. For nearly four years the company has been paying semi-annual dividends at the rate of 7% on its non-cumulative preferred stock and has disbursed to date, $3,124,485.

Boston. July 12.

(*From Our Special Correspondent.*)

That the public is taking a hand in a small way in copper stocks is very apparent, although as yet the market is one of specialties. Bingham, Centennial, Utah, United States and Winona have been the favorites until to-day, when Copper Range took a spurt of $5.25 to $50. The movement in the latter followed the widespread prediction advertised by Lawson that the price would cross $100. It was said that the market in this specialty was a real one, as all the stock offered was taken at the market. The day's dealings in Copper Range alone footed up 13,600 shares. Lawson issued a tissue during the day to the effect that there was no manipulation to the present activity in this stock. There are rumors of a deal, but nothing confirmatory is at hand at this writing.

Utah Consolidated has been more heavy than otherwise on more or less profit taking. It sagged to $36.50 last week, but subsequently rallied to $37.87½, closing at $37.25. It is thought, however, that there is more or less accumulation of the stock going on all the time, as is the case in Bingham Consolidated also. The latter worked off to $23, but is now up to $25.12½. It can be said with accuracy that a deal of some sort is shaping up in the Bingham camp, but it may not work out until October, perhaps. United States, also in the Bingham camp, has been steady between $21 @$21.75. Centennial became active to-day on payment of the second instalment of the $4 assessment levied last spring. It touched $24.87½, closing here.

Mohawk went up to $43.25 in sympathy with the Copper Range advance. The former is up $2.25 for the week and Winona is up from $7 to $7.75. Parrot was also in demand, advancing to $24.75, and Osceola is up $2 for the week to $63. This company had a very favorable period in the first half of the year. Allouez touched $8.87½, and Wolverine is up $1 to $75. United States Coal and Oil is firmer, touching $10.75, and Trinity was conspicuous by its rise to $5.50 Monday. Old Dominion has risen from $12.50 to $13.37½. This company produced 770 tons of copper during June.

The Utah mines have been favored by a reduction in the railroad rates to the Atlantic coast. A $10 rate per ton has been fixed, the same as given to the Butte mines. The rate has been $14.35. Rumors of a dividend by the Bingham are unfounded, as none will be declared this year, pending the accumulation of a surplus. It is learned that the Mexico Consolidated Mining & Smelting Company has been organized under the laws of Maine, with 200,000 shares, par $10, to take over the silver properties in Mexico recently acquired by J. A. Coram and associates. When the cost of equipping the mine is ascertained the stock will be offered to the public at about $15 per share.

Colorado Springs. July 8.

(*From Our Special Correspondent.*)

This has been a quiet week on the local exchange. Prices of Cripple Creek shares have not varied much from last week's quotations. The volume of trading has been lighter. The camp is getting down to hard work again, and all is moving along well. Merchants report a better business than for some time past, which indicates increased pay-rolls. With the labor conditions so much improved, it cannot help but tend to improve the stock market; but as yet there is no noticeable change. There is more leasing being done in the camp than for some time, and more new territory is being developed. Many of the leasers are doing unusually well, and new strikes are being made in different parts of the camp.

El Paso sold to-day for 86½c. Elkton closed 66½c. bid and 70c. asked. Portland sold for $1.60. C. K. & N. 32c. bid, 34c. asked. Isabella sold for 25⅜c. per share.

Salt Lake City. July 9.

(*From Our Special Correspondent.*)

This was a short week for trading in mining stocks, owing to the Fourth of July holiday. There has not been much activity, but the market has displayed some indications of recovery. There have been no marked advances noted in the quotations, but there seems to be a generally better feeling. Among the active stocks was Consolidated Mercur, in which there was considerable buying done. The price sank, however, and the stock closed weaker. Grand Central was also weak. Daly-West was inclined to go downward, but recovered toward the close. Mammoth, which has entered the dividend column again, found demand, and the stock remained firm. Silver King, after weeks of inactivity, was brought out in small bunches. The latter distributed its July dividend to-day—amount $100,000. The Daly-West Co. has posted its $72,000, and will pay it July 15. The Tetro Co. has posted another $3,000, payable July 25.

San Francisco. July 7.

(*From Our Special Correspondent.*)

This week has been a very short one, the Exchange having adjourned over until Wednesday morning. Consequently, business has been light. The North End stocks were weak, but the other Comstocks kept up fairly well.

Some quotations noted are: Ophir, $2.95; Consolidated California & Virginia, $1.15; Mexican, $1@$1.05; Hale & Norcross, 70c. per share.

On the San Francisco & Tonopah Exchange, business started up actively after the holiday. There was a large volume of trading and prices

kept up well. Tonopah of Nevada sold at $8.25; Montana Tonopah, $2.45@$2.47; Tonopah Extension, 95c.@$1.05; Tonopah Belmont, 83@85c.; MacNamara, 63c.; Tonopah Midway, 60c.; Tonopah Gold Mountain, 19@20c.; Rescue, 11c. per share.

On the California exchange, trading in oil stocks was quiet. There was little change in prices, but buying was light. Sterling was quoted at $2.80; Reed Crude, $1.50; Monte Cristo, 65c.; Independence, 26c. per share.

Monterey. July 6.

(From Our Special Correspondent.)

Exchange on New York has advanced from 21¼ to 21d because of the endeavor of bankers to bring exchange to a parity with the price of silver, which would have made exchange 224¾ on Monday, and 220⅝ Saturday.

Mining stocks sold as follows: In El Oro, Victoria, $38; Dos Estrellas, $2,100; Luz de Borda, $10; Equidad, $16, and Nacional, $22. In San Luis Potosi, Barreno, $67, and La Paz, $175. In Pachuca, San Francisco, $75; Santa Gertrudis, $80; Solidad, $815, and Sorpresa, $300.

COAL TRADE REVIEW.

New York, July 13.

ANTHRACITE.

The anthracite coal trade is quieter in practically all consuming territories. Retail buying has fallen off and no improvement is to be anticipated for weeks. The output of the mines for June was surprisingly heavy, considering that owing to the poor market for steam sizes, many washeries were closed or running on part time. The shipments were 5,728,795 tons, compared with 5,436,497 tons in June, 1903. The tonnage is the second largest in the history of the industry, being exceeded by that of January, 1903. The output of prepared sizes was probably the largest on record for a single month. The total shipments for the six months of 1904 amounted to 29,257,207 tons, compared with 31,884,952 tons in 1903, a decrease of 2,627,745 tons. There is little chance of the July output approaching the June figure, as the holiday of nearly a week on account of the Fourth temporarily checked the smooth operation of the mines.

The meeting of representatives of the mine workers at Pittston and the talk of strikes is of little significance, except as showing that the labor leaders are having difficulty in getting union men to pay monthly dues. The dispute over paying check weighmen was complicated by Mr. Wright's letter, which does not have the effect of a decision under the regular procedure of the Conciliation Board, but the matter will probably be adjusted without trouble.

Trade in the Northwest is quiet. A good tonnage is arriving at upper lake ports, and there is every reason to believe that when navigation closes the supply will be sufficient for all needs of the coming winter. The movement from the docks at present is not heavy. In Chicago territory trade is dull. In the city itself most dealers are well stocked up, and retail demand is small. The demand from country yards has fallen off in some regions, but in others is up to the summer average. Receipts by all-rail are moderate. Along the lower lakes and in Canadian territory there is slight demand for coal at some points and at others business is seasonably good. Along the Atlantic seaboard demand is light, retail buying having fallen off greatly, as thrifty householders who take advantage of discounts have supplied their needs. In general, however, business may be said to be on a normal July basis. The steam sizes continue a drug in the market. It appears that the average f. o. b. tidewater selling price of coal in June was $4.58 a ton, while the average of the circular rates was about $4.66.

BITUMINOUS.

The seaboard bituminous trade shows improvement. The continued dulness of the market and the low prices of coal have caused many small operators to close their mines, with the result of concentrating business in the hands of the larger concerns. Demand is not yet enough stronger to advance prices, but there is a better tone to the market, and producers are hopeful that the improvement will continue.

From the far East orders for coal are coming in comparatively freely, but there is an accumulation of vessels to discharge at some Eastern ports. This will accentuate the question of charters made with a ten-days' loading and discharge clause, as some vessels have already had to wait two weeks for berths, and present signs indicate longer delays. Along Long Island sound also demand has improved. At New York harbor points trade remains quiet, though some people profess to see improvement. The all-rail trade remains about the same as for the past 10 days. A few more outside orders are reported, but not enough to change general conditions.

Transportation from mines to tidewater is good. As demand is increasing, more complaints will be heard about stopping the movement of coal from Saturday noon till Monday morning. The car supply at the mines is up to all demands. The railroads are reported to be considering again the matter of car demurrage and of collecting all charges.

In the coastwise vessel market vessels are fairly plentiful, and coastwise freight rates for the larger craft are a little weaker. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 70c.; Boston, Salem and Portland, 80c.; Portsmouth, 90c.; Lynn, 95c.; Newburyport, 95c.@$1; Bath, 85c.; Bangor, 90c.@$1; Saco, $1.05 and towages; Gardiner, $1 and towages. From New York harbor ports rates are weak at 70c. to points around Cape Cod. The barge rates from New York to nearby sound points is very low, 30c., a figure which leaves little or no profit.

Birmingham. July 11.

(From Our Special Correspondent.)

State Mine Inspector J. M. Gray is still of the opinion that the coal production in Alabama for 1904 will be greater than it was last year, when the total production went to 11,700,735 tons. The production for the first half of the year is estimated to have been over 6,000,000 tons. The suspension of work on the part of the United Mine Workers of America in this State at those mines where the operating companies declined to make a new wage contract at the prices named by the mine workers, commencing July 1, will cut down the total output of coal, but even if it lasts a month or six weeks this will not prevent the total output being larger than it was in 1903. The non-union mines and mines operated with convict labor have been producing a large quantity of coal since July 1, and there is a good demand for the same. Twenty-nine of the commercial coal mine operators, those producing coal not used either in the manufacture of coke or iron, have signed temporary contracts with the United Mine Workers; that is, contracts based on last year's wage (prior to July 1, 1904), to be succeeded by such contract as is finally made with the furnace operators of the district. All work at these commercial mines continues without interruption. The estimate is made by the union officers that 5,000 out of 13,000 men are employed. These will be called upon to contribute $1 per week each to the fund to be used in sustaining the suspension at mines where the operators do not sign the contract. When the joint scale committee of the miners and operators adjourned after failing to arrive at an agreeable contract, it was announced that any one member of the said joint committee could request a reassembling of the committee. So far neither the operators nor the miners have made any move looking to the further consideration of the contract. There is an opinion expressed that the two sides may get together after July 15. The operators still maintain that their offer of 40c. minimum and 55c. maximum was made in good faith. The miners maintain that their wage proposition of 47½c. minimum and 57½c. maximum was made in good faith also.

The railroad and larger consumers are not suffering for coal. Non-union mines in this State are furnishing the Louisiana and Mississippi markets both by rail and water and no contracts are therefore being lost. The Pratt Coal Co. and the Pittsburg Coal Co., with mines in Jefferson and Walker counties, are shipping large quantities of coal into Louisiana. The commercial coal mine operators are selling their coal right along to consumers other than the furnace companies. The latter have enough stock on hand to last them for several weeks, and then have opportunity to purchase coal and coke from West Virginia at rates satisfactory, so it is stated. The coke production continues healthy.

Chicago. July 11.

(From Our Special Correspondent.)

Trade in anthracite is very dull. Receipts by lake are large, but stocks are accumulating in dock-yards to an unusual extent for the season. Considering the delay in lake receipts due to the strike, the present condition of things seems to dealers indicative of a general holding off by householders as regards the usual laying in of supplies for the winter. This, of course, will make trade unusually brisk five months hence, but it will bunch the business badly, and will cause the usual outcry against an advanced price. There is even talk that the 10c. a month discount is not enough, and that the discount should be made more, to make the system effective. The situation is especially bad, because of the possibility that, owing to the lateness with which the coal-carrying season began, dock stores may not be sufficient at the beginning of next winter to last until spring.

The bituminous market continues also very quiet, with no great activity in anything but the threshing-coal business. For threshing purposes the demand is increasing, and this trade will last for a month at least. Steam coals are in steady demand, though prices are low and there is keen competition. There are no changes of consequence from the conditions of last week, as regards demand for the different kinds of coal and prices. Western run-of-mine at $1.40@$1.90, and screenings at $1.30@$1.70 are the steadiest sellers, though there is a fair market for a summer season for the higher-grade Illinois and Indiana coals. It is perhaps consoling to the trade that if there has been no notable advance, there has been no falling off in any line. The stagnation seems bound to last through July.

Cleveland. July 12.

(From Our Special Correspondent.)

Steam coal prices have been depressed during the past 10 days by the stress of competition. The reduction has been ruinous. The result has been the shutting out of the middlemen and the straight sales of coal from the mines to the trade. Some recent reports have indicated that ¾-in. Pennsylvania coal has sold at 87½c. at the mine, while run-of-mine has been selling at about 80c. at the mine. Since the scale provides for the payment of 90c. for mining the coal, the producers are selling at less than cost.

The lake movement has not improved much. The shipment is somewhat slower than was anticipated at the beginning, some concern being felt for the outcome this fall.

Coke prices are easier. Good 72-hour foundry coke is selling at $2 at the oven and good furnace coke is selling at $1.60 at the oven.

Pittsburg. July 12.

(From Our Special Correspondent.)

Coal.—River shipments were resumed this week, and several million bushels will go to southern ports on the present rise. The monthly report of river traffic on the Monongahela river as compiled by the United States engineer's office shows that during the month of June 644,772 tons of coal was mined and shipped. This is one of the heaviest monthly shipments in years. The Pittsburg Coal Co. has put several idle mines in operation, and nearly all the mines in the Pittsburg district, both river and rail, are now running full. This week the Pittsburg-Buffalo Co., the largest independent producer in the district, put its Hazel mine on two shifts employing 200 additional miners. This is something unusual in this district.

Prices seem to be a trifle firmer, but $1@$1.10 a ton is still quoted for run-of-mine coal.

Connellsville Coke.—About 42% of the ovens in the Connellsville region are idle, and a number are scheduled to be blown out this week. The production declined, but shipments were heavier than the previous week. There has been a slight decline in prices. Furnace coke is quoted at $1.40@$1.45 and foundry at $1.75@$1.90. The production last week was 150,065 tons, a decrease of 10,310 tons. The shipments were 8,123 cars, distributed as follows: To Pittsburg and river points, 3,000 cars; to points west of Pittsburg, 3,493 cars; to points east of Everson, 1,630 cars. This was an increase of 818 cars.

A report of the production and shipment of coke for the first six months of the year has just been compiled. It shows that 5,204,954 tons were produced against 6,116,023 tons in the first six months of 1903, a decline in tonnage for this year of 911,069 tons. The shipments for the first half of this year amounted to 4,934,076 tons, compared with 6,261,300 tons last year.

San Francisco. July 7.

(From Our Special Correspondent.)

Mr. J. W. Harrison's circular, under date of July 7, says: "Since the last circular five vessels have arrived from Australia, with 7,698 tons of coal. The quantity of coal delivered here from the colonies during the past month amounts to 6,778 tons, the amount received here from the same sources in June, 1903, amounted to 27,827 tons. This shows a marked shrinkage in the quantity of Australian coal now being consumed in this market. There are now on the chartered list of coal carriers from Newcastle 35 vessels with a carrying capacity of about 95,000 tons; the larger portion of this list will not arrive here before the end of this year. The falling off this year of the consumption of Australian coal is mainly atributable to the increased demand for oil as a steam fuel. As a matter of fact the only grades of Australian coal which will find ready sale here locally are those principally adapted for domestic purposes, as the principal competition which colonial coals have in this market for household uses comes from British Columbia, and their products can be delivered here if necessary at a lower figure than the Newcastle output. The proprietors do not think it prudent to make any marked reduction to increase their sales by reducing values, hence prices remain steady at present. The managers of the Western Fuel Co. and the Pacific Coast Co. are enlarging their bunkers to facilitate their handling their importations more economically. Mr. John Brown, of the firm of Messrs. J. & A. Brown, is at present in the city looking after the interests of his extensive collieries at Newcastle in New South Wales."

Pacific coast coals in large lots to dealers are quoted as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; white ash, $5.25. For Rocky Mountain coals, ex-car, to dealers, prices are $14 for Colorado anthracite, $11.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside. Eastern coal is nominal at $14 for Pennsylvania anthracite and $13 for Cumberland. Foreign coal in cargo lots is quoted at $13 for Welsh anthracite, $8.50 for cannel and $7.50 for Wallsend and Brymbo.

Foreign Coal Trade. July 13.

Export trade continues quiet here, although current prices of coal and ocean freight rates are both in favor of an outward movement.

Coal production in Germany for the five months ending May 31 is reported as follows, in metric tons:

	1903.	1904.	Changes.
Coal	46,638,974	49,216,861	I. 2,577,887
Brown coal (lignite)	17,839,326	19,509,148	I. 1,669,822
Total mined	64,478,300	68,726,009	I. 4,247,709
Coke made	4,592,283	4,981,379	I. 389,096
Briquettes made	4,002,600	4,534,225	I. 531,625

Of the coal mined this year Prussia alone produced 45,977,867 tons; and of the brown coal 16,888,476 tons.

Messrs. Hull, Blyth & Co., of London and Cardiff, report, under date of July 2, that there is no change. Quotations are: Best Welsh steam coal, $3.84; seconds, $3.66; thirds, $3.48; dry coals, $3.48; best Monmouthshire, $3.54; seconds, $3.48; best small steam coal, $1.98; seconds, $1.86; other sorts, $1.62.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, both exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½% discount.

Mediterranean freights are still weak, and business is inactive. Some rates quoted from Cardiff are: Marseilles, $1.25; Genoa, $1.20; Naples, $1.20; Las Palmas, $1.44; St. Vincent, $1.56; Rio, $2.10; Santos, $2.46; Buenos Ayres, $1.80.

IRON TRADE REVIEW.

New York, July 13.

The iron markets continue very dull. Here and there a little activity appears, but this is spasmodic, and is soon over. Pig iron prices are lower, and buyers do not seem to be worrying over the decreased production. Doubtless the reports of blowing out of furnaces are exaggerated—for a purpose—and there will be plenty of iron available when demand revives.

Finished material is also dull, and new business is in small lots for quick deliveries. No one wants to do business just now.

At the same time, the general feeling is not despondent, and there is a widespread belief that the early fall will see a great improvement.

The action of the Billet Pool, in deciding to maintain prices of steel billets at the present rate of $23 per ton at the mill, may be taken as another indication of the determination of the United States Steel Corporation to endeavor to maintain prices, even at the risk of limiting business. The Steel Corporation is, of course, the ruling element in the pool, and its policy must in the end govern. The price of billets has been nominal for some time past, as the independent producers have been selling at rates varying from $3 to $4.50 below the pool price, and upon this business the present decision will have no possible effect. It looks very much as if the determination to adhere to this policy is a mistaken one, unless new business should develop later at a rate which cannot now be looked for. Much the same comment may be made on the similar action, to maintain prices, which was agreed on by the Rail, Plate and Structural pools, at their meetings last week. They all preferred restricted business to a reduction in prices.

Birmingham. July 11.

(From Our Special Correspondent.)

The iron market conditions show but little change. There has been a little stiffening in the quotations for the product. The demand has been only fair, with one large consumer making a fairly large size purchase during the past week. The Tennessee Coal, Iron & Railroad Company has four furnaces banked at Bessemer, pending a settlement in the coal mining circles. The curtailment will probably be extended in the next day or two when the Woodward Iron Co. will bank fires in its two furnaces at Woodward to permit of repairs and the Sloss-Sheffield Steel & Iron Company will blow out one of its city furnaces also to permit of repairs.

The following quotations are given for pig iron in this section: No. 1 foundry, $9.50@$10; No. 2 foundry, $9.25@$9.50; No. 3 foundry, $9@$9.25; No. 4 foundry, $8.50@$8.75; gray forge, $8@$8.50; No. 1 soft, $9.50@$10; No. 2 soft, $9.25@$9.50.

The cast-iron pipe situation continues very active. Steel interests in this district are also active, both the steel plants in the district producing steadily. The rail mill attached to the Ensley plant is turning out a large quantity of rails and regular shipments are being made.

Chicago. July 11.

(From Our Special Correspondent.)

There is, perhaps, a slight improvement in the pig-iron market; certainly there is no backward movement. Sales for the week have not been great, but inquiries are more numerous, and there is, to the seller, a hopeful sign in the longer time ahead for which buyers are willing to contract. Sales are running into the end of the third quarter of 1904, and there is a demand for extension into 1905, which the producers of iron, uncertain of the political and business changes possible, are reluctant to grant. Thus the condition is reversed from that of six months ago, when selling agents were begging consumers to place large orders far ahead. The size of orders continues small enough, however, in comparison with those of six months to a year ago. A thousand tons is now a large order, of as much relative importance as one for 5,000 tons a year ago. Northern iron is in better demand, relatively, than Southern, and sells for $13.25@$13.75, as heretofore, for No. 2. Southern brings $9.25@$9.75 Birmingham.

Coke is weaker and a little lower in price—$4.60@$4.70 for Connellsville. The market no sooner recovers a little from the depression than more coke is piled in, with the consequence of lively selling to escape demurrage charges.

New York. July 14.

Pig Iron.—The market is quiet with prices unchanged. For northern iron we quote: No. 1 X foundry, $15; No. 2 X, $13.75@$14.25; No. 2 plain, $13.75@$14.25; gray forge, $13. For southern iron on dock, prices are about as follows: No. 1 foundry, $13.50; No. 2 foundry, $13; No. 3 foundry, $12.50.

Plates.—Buying is yet in small lots and the market is dull. Sheared plates are quoted as follows: Tank, 1.25-in. and heavier, 1.75@1.85c.; flange, 1.85@2c.; marine, 1.95@2.10c.

Bar Iron and Steel.—There is no change in conditions. Refined bars are quoted at 1.495c., in large lots, with steel at the same figure. Common iron bars can be had for 1.35c.

Steel Rails.—Quotations remain $28 for standard sections, f. o. b. mills. Light rails are quoted f. o. b. eastern Pennsylvania mills, as follows: 12-lb., $27; 20-lb., 25-lb., 30-lb. and 35-lb., $25; 40-lb. and 45-lb., $24.

Structural Material.—Demand continues light, but the outlook is improving. Large lots at tide-water are still quoted nominally at 1.75@2c. for beams, angles and channels.

Philadelphia. July 13.

(From Our Special Correspondent.)

Some of our northern pig iron makers are congratulating themselves that cutting competition from Alabama furnaces is at an end. Both Alabama and Virginia furnaces have recently turned down offers for pig iron at law figures and it is understood that quotations have been given out within a week over 25c. per ton above those heretofore prevailing. Our pig iron people are somewhat despondent at the necessity for blowing out furnaces and the unwillingness of many large consumers in the East to make purchases which they had practically promised to make. Within the past month or two a good many understandings or tentative understandings were had looking to the placing of a good deal of business during July. Now that we are in the middle of July, scarcely any of this business has turned up. A further depression seems to have come over the market and only very moderate sales of forge and foundry have been made. Large transactions in basic, however, have been very quietly consummated at rates somewhat below those usually quoted. The average quotations for No. 1 X foundry are $15.50; No. 2 X foundry, $14.50; No. 2 plain, $14; Alabama No. 2, $13.50; standard forge, $13.50; basic, $13.25, though the transactions referred to were closed below this figure.

Pittsburg. July 12.

(From Our Special Correspondent.)

There is no improvement in the iron and steel business, and none is expected before the closing quarter, but great confidence is expressed that there will be a revival early in the fall. Pig iron is believed to be down as low as it will go, that point being reached when a furnace interest quoted bessemer at $11.40, Valley furnace. Most of the furnaces have inquiries for pig iron with offers lower than the minimum price quoted, one consumer offering

$11.15, Valley, for bessemer and another $11.25. There is no inducement to continue producing iron, and but few merchant furnaces will be in operation on August 1. No. 2 furnace of the Carnegie Steel Co., situated at South Sharon, will resume on July 18, and it is expected that No. 1 furnace, which has also been out, will be put in blast shortly.

The meetings of the steel associations were quietly held, and nothing of importance was done except the re-affirmation of prices. Billets remain at $23, although it is known that all sales within the past few weeks have been at $2 and $3 under that rate, and where contracts are on a sliding scale based on pig iron, the price is considerably lower. The Billet Association met in New York on Thursday, and it was evidently considered that a reduction in price would not stimulate business and might have a depressing effect on the present weak market. The Plate Association also re-affirmed prices, although it is known that the pool price has been shaded for sometime past. The new prices announced by the National Tube Co. last week indicate that there has been a decline in the price of merchant steel pipe since January 1 of from $8 to $9 a ton. Sheets are nearing the lowest point ever reached, which was in 1897, when No. 28 gauge black sheets sold at 1.85c. The prevailing quotation to-day is 2.10c., and it is believed that 2c. would be accepted on a desirable order. Prices of galvanized sheets are lower, and corrugated roofing has been declining steadily, and is now quoted at $1.50 a square for No. 28 gauge in car-load and larger lots. This price could be shaded on a large order. Not much new business in structural material has been placed lately, but quite a lot of erection is planned, and some large contracts are likely to be let in a short time.

A large number of iron, steel and tin-plate mills are idle, some on account of dull trade, but most of them were forced to close for the annual repairs. No move has yet been made by either the Amalgamated Association of Iron, Steel & Tin Workers or the Republic Iron & Steel Co. to name a board of conciliation to arrange the iron wage scale for the year. In the meantime the company will continue to pay the old scale. It is said the Republic Co. is not anxious to have the proposed conciliation board examine its books. A number of independent concerns have signed the scale, and will be given the benefit of any changes that may be made later, when a definite settlement is reached with the leading producer. The steel hoop department of the Carnegie Steel Co. contains four union mills, two at Youngstown, one at Girard and one at Warren, O. The management did not avail itself of the continuous arrangement offered by the Amalgamated, but closed these mills. It is willing to pay the scale for puddling, but asks for a cut in the finishing scale, ranging from 25 to 35%. It was reported that an effort would be made to start these plants on a non-union basis and fight the Amalgamated Association, but the report was officially denied. It is now said the company will remove the Warren plant to Sharon and connect it with non-union works at that place, and that part of the Girard plant will be removed to the Pittsburg district. Most of the tin-plate plants are closed for repairs, and no date has been fixed for the final adjustment of the wage scale. No trouble is anticipated, and it is confidently believed the Amalgamated Association will concede the demand of the American Sheet & Tin Plate Co. for a continuation of the rebate arrangement.

Pig Iron.—Very few sales have been made, and only small lots for early shipment, and prices continue to decline. It is believed rock-bottom has been reached by the quotations made this week. Bessemer is offered at $11.40, Valley furnace: foundry No. 2 at $12.60, Pittsburg, and gray forge at $12@$12.25, Pittsburg.

Steel.—Prices remain unchanged, it having been decided by the different associations that reductions would not benefit the trade. Bessemer and open-hearth billets remain at $23; plates at 1.60c. and steel bars at 1.35c. It is known that billets are selling at $2 and $3 under the association price, but there is very little business going.

Sheets.—The market has not improved since the last report. There is some business being done at prices that are not made public. The lowest quotation for No. 28 gauge black sheets is 2.10c. and for galvanized, 3.10 to 3.15c.

Ferro-Manganese.—The leading interest continues to quote $41.50 for 80% domestic.

Cartagena, Spain. June 25.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—There were no shipments of iron ore during the week. The local market is extremely dull and prices are again lower. An important meeting took place during the week to study the proposed change in mining taxes. The Government offers to abolish the tax on the gross output of the mines, but at the same time will increase the royalty charges, irrespective of production. This will be a relief in one respect, but will be rather hard upon the small mines and upon those that are not producing. There was much difference of opinion as to this proposition.

Quotations are now as follows: Ordinary 50% ore, 6s. 3d.@6s. 6d.; special low phosphorus, 7s.@7s. 6d.; specular iron ore, 58%, 9s.; magnetic ore, 60%, 10s. 9d. for lumps and 8s. 9d. for smalls; manganiferous ores range from 9s. 3d. for 12% manganese and 35% iron up to 14s. for 20% manganese and 20% iron.

CHEMICALS AND MINERALS.

New York, July 13.

Some improvement is noticeable in a few lines, but on the whole the trade is confronting the usual quiet season. Prices are easier for primary products, while jobbers in control of prompt business in manufactured goods are inclined to undersell makers.

Cyanide.—Importers continue to quote on the basis of 19@20c. per pound. Business is limited.

Bleaching Powder.—Practically nothing of importance has transpired to change first hands' quotations of $1.20@$1.25 per 100 lb. for prime brands. Jobbers, of course, will sell at 5 to 10c. less to clear their stocks.

Copper Sulphate.—Deliveries are principally on regular contracts, hence the quotation of $4.75@$5 per 100 lb. is nominal.

Acids.—There is more strength to report in the commercial acids, especially sulphuric and muriatic, although the former will likely reap the benefit of the lower cost of raw material when new contracts are made.

We quote as below per 100 lb., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity.

Muriatic, 18°	$1.50	Oxalic, com'l	$5.10@$5.50
Muriatic, 20°	1.60	Sulphuric, 50°, bulk, ton	13.50@14.50
Muriatic, 22°	1.75	Sulphuric, 60°, 1.05 bulk, ton	18.00@20.00
Nitric, 36°	4.50	Sulphuric, 66°, 1.20 bulk, ton	21.00@23.00
Nitric, 38°	4.75		
Nitric, 40°	5.00		
Nitric, 42°	5.50		

Brimstone.—Best unmixed seconds for shipment are now quoted at $21.50@$21.75 per ton, while thirds are about 50c. less. New business is too small to be worthy of mention, while deliveries on season contracts are only of a hand-to-mouth character.

Sicilian Brimstone Market.—Messrs. Emil Fog & Sons, of Messina, write under date of June 30 that the great demand from the vine countries continues, and France and Italy's consumption this year has almost trebled. Southern Austria, South Russia and the German Rhenish provinces also imported considerably more than last year. We note with pleasure increased imports at Portland, Me., which shows that American paper mills so far are not turning to pyrites. We quote per long ton, f. o. b. as follows: Best unmixed seconds, in bulk, 81s. 9d.; best seconds ground, in bags, 90s.; best thirds in bulk, 79s. 6d.; current thirds, 77s. 9d.; refined block in bulk, 90s. 6d., and in bags, 93s.; sublimed flowers, pure, in bags, 108s. 3d.; current, 100s. 6d.; commercial, 94s. 9d.; refined roll, in bags, 96s. 3d., and in casks, 101s. 9d.; roll sulphur in sticks, 105s. 6d.@108s., according to size.

Pyrites.—In certain directions consumption has increased, but on the whole, judging from the smaller imports, this year will not equal last, unless the domestic production continues to grow. Talk of erecting new works to compete with the pyrites "combine" is current, but why suggest that an agreement to fix prices exists among sellers when competition is as keen among importers as it is between importers and domestic producers of pyrites. It is true that market prices seldom change, but this is not because a regular schedule is voted by all sellers; it is primarily the result of the long-time contracts that are made with consumers.

We quote domestic pyrites 10@10.5c. per unit for lump ore, f. o. b. Atlantic coast mines, and 9c. per unit for fines; sulphur content varies from 42@44%. Spanish pyrites, carrying from 46@52% sulphur, are quoted at 10@12.5c. per unit for lump, and 9@10c. for fines, delivered at Atlantic ports.

Nitrate of Soda.—Demand for spot and nearby cargoes is quiet, but the advancing market on the coast has instilled renewed strength into prices at consuming centers. The final decision in fixing the quota of exports for the fourth fiscal year at 36,000,000 qtl., and the belief that not more than 34,000,000 qtl. will be actually shipped, has created the expectation of continued high prices. At present spot 95% quality is quoted at $2.15 per 100 lb.. and 96%, $2.175, while futures stand at $2.125 for 95%, and $2.15 for 96%.

Messrs. Mortimer & Wisner's monthly statement of nitrate of soda, dated New York, July 1, gives the following interesting statistics, in long tons:

	1904.	1903.	1902.
Imported into Atlantic Ports from West Coast S. A. from Jan. 1, 1904, to date.	133,014	110,692	63,481
Stock in store and afloat July 1, in New York	500	2,600	227
Philadelphia	....	1,620	....
Baltimore	1,500	5,375	....
To arrive, due Oct. 15, 1904.	90,000	52,000	68,933
Visible supply to Oct. 15, '04.	92,000	61,595	69,160
Stock on hand Jan. 1	8,100	7,800	10,000
Deliveries past month	23,670	20,202	18,147
Deliveries since Jan. 1 to date.	131,014	108,897	73,600
Total yearly deliveries	....	229,589	179,613
Prices current, July 1.	2.15c.	2c.	2c.

Above quotations are for 96%, 95% can be had at from 2½c. to 5c. cheaper.

In reviewing the situation of nitrate of soda in the season ending June 30, Messrs. W. Montgomery & Co., of London, furnish the following interesting statistics, in long tons:

	1903.	1904.
So. Am. shipments, Jan.-June	550,000	577,000
So. Am. shipments, fiscal year	1,315,000	1,462,000
Afloat for Europe, June 30	221,000	207,000
Stocks in Great Britain	5,500	11,000
Stocks in Continental ports	31,000	21,000
Consumption, Great Britain, 6 mos.	77,000	78,000
" Great Britain, year	112,000	111,000
" Continent, 6 mos	754,000	749,000
" Continent, year	1,003,000	1,012,000
" United States, year	246,000	278,000
" other countries, year	19,000	32,000
" in the world, year	1,380,000	1,433,000
Visible supply, June 30	258,000	239,000

Prices have been consistently steady as a result of the good agricultural season, which is evidenced by the increase of over 3% in the world's consumption. Free on board prices throughout the year have ranged from 6s. 6d. to 7s. 6d. per quintal.

Chilean Nitrate of Soda Market.—Messrs. Jackson Bros., of Valparaiso, write under date of May 28 that since May 19 there has existed a steady demand for 95% deliveries up to early February, 1905, and owing to the limited quantity offered for sale prices have advanced from 7s. to 7s. 2d. alongside terms, for shipments during this year; scarcely any January-February has been placed in the market, two parcels being disposed of at 7s. alongside, but at present a slightly higher price could be obtained for January alone. June-December 96% fetched 7s. 3d. at the commencement of the fortnight, but 7s. 4d. has since been paid for June-August deliveries. The market closed with buyers of 95% June-December at 7s. 1½d., January-February, 7s., while sellers of 96% ask 7s. 3½d. for June-October, and 7s. 3d. for November-February; all ordinary terms. The price of 7s. 1½d. with an all-round freight of 17s. 6d. stands in 8s. 10d. per cwt., net cost and freight, without purchasing commission. Reported sales are 1,348,390 qtl., and resales, 154,000 quintals.

Saltpeter.—Consumption in America in June was 5,792 bags, making a total of 39,121 bags for the six months this year, which is an increase over 1903. Stocks on hand on July 1 were 627 bags, which, added to 4,904 bags on the way, makes the visible supply 5,531 bags, as against 14,219 bags a year ago. Crude saltpeter is quoted at $3.50@$3.625 per 100 lb., and refined $4.25@$5.

Sulphate of Ammonia.—The absence of buyers has weakened prices for gas liquor to $3@$3.05 per 100 pounds.

Phosphates.—Shipments last month showed a falling off. From Savannah the Florida hard rock exports in June were 7,924 tons, making a total of 69,178 tons for the six months, as against 79,073 tons in 1903. Germany was the largest purchaser. Domestic shipments from Charleston, S. C., in the 10 months ending June 30 were 23,575 tons crude, and 4,217 tons ground rock, which shows an improvement over the corresponding period in the year previous.

Phosphates are quoted as follows, per ton:

Phosphates.	F. o. b.	C. i. f. Gt. Britain or Europe.
*Fla., hard rock, 77@80%....	$7.25@$7.50	$9.89@11.10
land pebble, 68@73%...	3.75@ 4.00	6.39@ 8.05
†Tenn., 78@80%.....	4.00@ 4.25	9.88@10.66
78%.....	3.75@ 4.00	.....
75%.....	3.25@ 3.50	.....
73@74%.....	2.95@ 3.20	.....
‡So. Car. land rock.....	3.00@ 3.25	.....
river rock, 55@60%.	2.75@ 3.00	5.75@ 6.56
Algerian, 63@70%.....	....	6.82@ 7.32
58@63%.....	....	6.05@ 6.50
53@58%.....	....	4.95@ 5.00
Tunis (Gafsa).....	....	5.75@ 6.50
Christmas Isle, 80@85%.....	....	11.75@12.54
Ocean Isle, 82@88%.....	....	12.54@12.98
Somme, Fr., 70@75%.....	....	10.63@11.02
Bordeaux, Fr., 60@65%.....	....	7.60@ 7.72
55@60%.....	....	6.44@ 6.55
Liege, Bel., 60@65%.....	....	7.00@ 7.10

* F. o. b. Florida or Georgia ports. † F. o. b. Mt. Pleasant. ‡ On vessel, Ashley River, S. C.

METAL MARKET.

New York, July 13.

Gold and Silver Exports and Imports,

At all United States Ports in May and Year.

Metal	May		Year.	
	1903.	1904.	1903.	1904.
Gold:				
Exports.	$14,488,268	$43,071,053	$18,828,853	$36,928,849
Imports.	1,462,845	10,472,512	11,208,501	42,878,021
Excess	E.$13,025,423	E.$32,598,541	E. $7,620,152	E.$24,050,828
Silver:				
Exports.	2,148,412	5,098,013	15,948,929	21,957,065
Imports.	1,312,581	1,943,988	7,930,489	10,983,827
Excess	E. $535,831	E. $3,154,025	E. $8,018,440	E.$10,973,238

These exports and imports cover the totals at all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, New York.

For the week ending July 9 and total from January 1.

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week.....	$500	$45,059	$730,915	$20,678
1904.....	63,679,962	3,563,629	21,291,094	471,564
1903.....	23,943,989	3,538,821	9,917,481	1,167,488
1902.....	16,504,786	1,246,071	14,142,280	2,065,861

General business continues dull, and there is every prospect that this condition will last through the vacation months of July and August. The crop prospects, however, seem to be improving.

The statement of the New York banks—including the 56 banks represented in the Clearing House—for the week ending July 9 gives the following totals, comparison being made with the corresponding week of 1903:

	1903.	1904.
Loans and discounts.....	$909,529,000	$1,078,294,800
Deposits	892,143,300	1,158,150,300
Circulation	43,910,200	39,168,400
Specie	156,673,100	243,093,900
Legal tenders	74,371,200	82,461,400
Total reserve	$231,044,300	$325,555,300
Legal requirements	223,035,825	289,537,575
Balance surplus	$8,008,475	$36,017,725

Changes for the week this year were increases of $3,263,300 in loans and discounts, $5,161,500 in deposits, and $3,722,100 in specie; decreases of $41,200 in circulation, $2,519,300 in legal tenders, and $87,575 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding date last year:

	1903.		1904.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd—	$156,673,100	.....	$243,093,900	.....
England—	183,579,040	.....	171,380,905	.....
France—	502,584,330	$224,891,035	551,253,640	$226,229,390
Germany—	163,845,000	57,570,000	160,955,000	56,555,000
Spain—	72,800,000	103,640,000	73,560,000	125,525,000
Netherlands—	19,703,000	33,261,000	28,732,000	47,981,000
Belgium—	14,803,335	7,401,665	14,860,000	7,430,000
Italy—	92,560,000	11,325,000	111,760,000	14,948,000
Russia—	392,780,000	44,925,000	460,435,000	41,865,000
Austria—	229,150,000	65,900,000	236,060,000	64,535,000

The returns of the Associated Banks of New York are of date of July 9, and the others July 7, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Shipments of silver from London to the East for the year up to June 30 are reported by Messrs. Pixley & Abell's circular as follows:

	1903.	1904.	Changes.
India	£3,244,525	£5,320,923	I. £1,876,398
China	220,918	343,091	I. 122,173
Straits	364,579	58,103	D. 306,376
Total	£3,830,022	£5,722,117	I. £1,892,095

Receipts for the week, this year, were £238,000 in bar silver from New York, and £9,000 from Australia; total, £247,000. Shipments were £41,500 in bar silver to Bombay, £33,684 to Hong Kong, and £52,000 to China; total, £127,364.

Indian exchange is easier, owing to the abundance of money in the presidencies. The Council bills offered in London were sold at an average of 15.96d. per rupee. The demand for silver from India continues good.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars.....	$0.46	$0.47½
Peruvian soles and Chinese pesos.....	.41	.44
Victoria sovereigns.....	4.86	4.87
Twenty francs.....	3.86	3.88
Spanish 25 pesetas.....	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

July.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. Cathodes, Cts. per lb.	Copper. London, £ per ton.	Tin, Cts. per lb.	Lead, Cts. per lb.	Spelter. N. Y., Cts. per lb.	Spelter. St. Louis, per lb. Cts.
7	12⅜@12⅝	12¼@12⅛	12@12¼	57⅛	25⅞	4.20	4.87½	4.72½
8	12⅜@12⅝	12¼@12⅛	12@12¼	57¼	26	4.20	4.87½	4.72½
9	12⅜@12⅝	12¼@12½	12@12¼	....	26	4.20	4.87½	4.72½
11	12⅜@12⅝	12¼@12¼	12@12¼	57¼	26⅛	4.20	4.87½	4.72½
12	12⅜@12⅝	12¼@12½	12@12¼	57 5/16	26¼	4.20	4.87½	4.72½
13	12⅛@12⅝	12¼@12½	12@12¼	57¼	26⅜@26⅝	4.20	4.87½	4.72½

London quotations are per long ton (2,240 lb.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wire-bars.

SILVER AND STERLING EXCHANGE.

July	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.	July.	Sterling Exchange	Silver. New York, Cents.	Silver. London Pence.
7	4.87⅛	58¼	26 3/16	11	4.8720	58¼	26⅛
8	4.87¼	57⅞	26 1/16	12	4.87⅜	58⅛	26¾
9	4.87⅛	57⅞	26 1/16	13	4.87⅛	58	26 1/16

New York quotations are for fine silver per ounce Troy London prices are for sterling silver .925 fine.

A French government tender for silver has kept the market firm. Recent information from the up country in India is to the effect that the demand for the bazaars is largely satisfied; and consequently the buying for this market is not as strong as it has been.

Reports are current that the National Lead Co. is to be consolidated with the United Lead Co., and that the negotiations for the merger are practically complete. It is impossible to obtain any confirmation of these rumors, and nothing will be made public until after the next meeting of the directors of the National Lead Co., which will be held July 21. The reports are generally credited, and it appears probable that there is a substantial foundation for them. Since the organization of the United Lead Co. there has been some sharp competition between the two companies, but recently this has ceased. It is also a fact that there has been lately a considerable advance in National Lead stock, and it is reported that this was caused by heavy buying for parties interested in the United Company.

Details of the merger cannot, of course, be ascertained, but it may be assumed as altogether probable that some agreement has been reached. It will bring the lead trade under very close control, on the consuming, as well as the producing side.

Copper has been very active throughout the week, and the market displayed considerable strength. The European demand remains satisfactory, and home consumers have also bought freely for early as well as future delivery, evidently considering the political outlook a quantity negligible now that the conventions are over. Labor troubles are reported from the Lakes, but no definite information is obtainable as yet. The closing quotations are given as 12½@12⅝ for lake; 12⅜@12½ for electrolytic in cakes, wirebars or ingots; 12⅛@12¼ for cathodes, and 12⅛@12¼ for casting copper.

The market for standard copper in London closed last week at £57 5s.; opened on Monday at the same price, and the closing quotations on Wednesday are cabled as £57 5s.@£57 6s. 3d. for spot, and £57 2s. 6d.@£57 3s. 9d. for three months. Refined and manufactured sorts are quoted: English tough, £60 5s.@£60 10s.; best selected, £60 15s.@£61; strong sheets, £69 15s.@£70; India sheets, £64 15s.@£65; yellow metal, 6¼d.

Exports of copper from New York and Baltimore for the week ending July 12 were 3,997 tons, principally to Great Britain, Germany, Holland, France and Russia. There were also shipped 115 tons matte to Italy, the first cargo in some time. Imports at New York for the week of July 8 were 316 tons of copper.

Tin has displayed considerable strength throughout the week, and there has been good inquiry on the part of consumers. Prices have steadily advanced, the closing quotations being given as 26¼@26⅜ for spot and futures.

The foreign market, which last week closed at £118, opened on Monday at the same price, on Tuesday advanced to £118 10s., and the closing quotations on Wednesday are cabled as £119 12s. 6d.@£119 15s. for spot and £120@£120 2s. 6d. for three months. It will be noticed that the backwardation has entirely disappeared and a premium for future tin established instead.

Lead continues in good demand, early deliveries being rather scarce. The closing quotations are given as 4.20 New York and 4.12½@4.15 St. Louis.

The foreign market remains firm, Spanish

lead being quoted at £11 12s. 6d., and English lead at £11 15s.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is firm and fairly active. Missouri brands are salable at 4.12½c., but are generally held higher.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of June 25, that the price of silver during the week has been 14.25 reales per oz. Exchange is lower, standing at 34.90 pesetas to £1. Local quotation for pig lead has been 63.75 reales per quintal, which, on current exchange, is equal to £10 4s. 6d. per long ton, f. o. b. Cartagena. Exports were 255,504 kg. pig lead, 200,000 kg. desilverized lead and 848 kg. silver bars, all to Marseilles.

Spelter continues very firm indeed, and high prices are being paid for ore. The consumptive demand is satisfactory. The closing quotations are given at 4.72½ St. Louis and 4.87½ New York.

The foreign market is steady and good ordinaries are quoted at £22; special at £22 5s.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is strong, but quiet. The latest sales are on a basis of 4.75c., East St. Louis, for both prompt and forward delivery.

Silesian Spelter Market.—According to information furnished by Paul Speier, under date of June 27, the tendency of the spelter market is generally weak. Business is dull and purchases are made only for immediate requirements. Producers are of the opinion, however, that the market will improve in the near future and are unwilling to make any large concessions from the ruling prices. The stocks held by galvanizing and brass manufacturers have become depleted, so that the latter cannot hold off much longer from the market. Exports in May amounted to 6,143 metric tons, against 6,541 tons for the same month of the previous year. Sheet zinc has been in fairly good demand at unchanged prices. For zinc dust the home market has been satisfactory, but exports are far below normal. Prices have fallen off somewhat and present quotations rule at 40.5@41 marks for 100 kg. in lots of 10 tons or more f. o. b. Stettin.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of June 25, that the demand for zinc ore remains steady. Quotations for blende, 35% zinc are 67 fr. and calamine, 30% zinc, 47 fr. per ton. No exports reported for the week.

Antimony is unchanged: Cookson's at 7@7⅝; Hallett's, 6⅞@6½; U. S., Italian, Japanese, French, Hungarian and Chinese, at 5⅞@6c. per pound.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per pound.

Platinum.—Quotations are nominally $18.50 per ounce, but the tendency is upward, and higher prices are expected.

Platinum in manufactured forms is very firm. Messrs. Eimer & Amend, of New York, quote for different forms as follows: Heavy sheet and rod, 75c. per gram; foil and wire, 77c.; crucibles and dishes, 80c.; perforated ware, like cones, etc., 85c. per gram.

Quicksilver.—Prices are weaker all around. In New York large lots have been offered at $43.50 per flask, with $44.50 quoted for smaller orders. The San Francisco price continues $43@$44 for domestic business, but as low as $41.50@$42 has been offered for export. The London price is £7 17s. 6d., with the same quotation from second hands.

Minor Metals and Alloys.—Thallium is quoted at 60@65 marks per kg., at Breslau, Germany. Manganese metal is quoted 360 marks per 100 kg., f. o. b. Bremen, Germany, Manganese tin alloy, 55% is quoted 365 marks per 100 kg. for first quality, and 225 marks for second quality, both f. o. b. Bremen.

For other minor metals, and their alloys, wholesale prices, f. o. b. works, are as follows:

	Per lb		Per lb
Aluminum		Ferro-chromium (74%)	.12½c.
No. 1, 98% ingots	.33@37c.	Ferro-Tungsten (37%)	.38c.
No. 2, 90% ingots	.31@34c.	Magnesium, pure (N. Y.)	.60c.
Rolled Sheets	4c. up	Manganese	$2.75
Alum-bronze	.20@23c.	Mangan'e Cop. (20% Mn)	.32c.
Nickel-alum	.35@39c.	Mangan'e Cop. (30% Mn)	.38c.
Bismuth	$2.10	Molybdenum (Best)	$2.00
Chromium, pure (N. Y.)	.80c.	Phosphorus, foreign	.45c.
Copper, red oxide	.50c.	Phosphorus, American	.70c.
Ferro-Molybde'm (50%)	.$1.25	Sodium metal	.50c
Ferro-Titanium (10%)	.90c.	Tungsten (Best)	.88c
Ferro-Titanium (20@25%) N. Y.	.55c.		

Missouri Ore Market. July 9.

(From Our Special Correspondent.)

The highest market price reported paid for zinc ore during the week was $37 per ton, a price $2 per ton higher than the price reported a week ago. The assay basis was raised on the best grades of ore to as high as $35 per ton, though this was not general. In fact, there was little about the market that could be classed as of a general nature, prices varying altogether according to the emergency. Under such existing circumstances it may be judged that the prices would be as varying as the moods or the necessity of the occasion would warrant. The market has come to his state through a combination of the forces of nature and of man. As has been previously outlined in the JOURNAL, some 25 of the operators of the district decided to restrict the output until the reserve stock could be disposed of. The week including the Fourth of July and the week following were picked upon as an opportune time to give the mine-owners and employees an oportunity of visiting the World's Fair, and a holiday was decided upon. The Fourth coming on Monday, there was not a mine running on that day in the district. A few of those who had not joined the movement started up on Tuesday and a few more on Wednesday, there being at the end of the week perhaps 50% of the mills in operation; but being the mills over small producing mines, there was not to exceed 2,000 tons' output for the week.

Shipments for the week:

	Zinc, lb.	Lead, lb.	Value.
Webb City-Carterville	1,512,560	484,330	$36,910
Joplin	1,452,420	179,020	29,450
Galena-Empire	737,300	94,250	13,835
Duenweg	541,780	31,100	10,035
Aurora	563,090	6,550	8,160
Alba-Neck	484,230	....	8,230
Carthage	172,280	....	2,775
Prosperity	122,810	24,100	2,600
Granby	158,000	28,000	2,480
Diamond	66,800	9,560	1,320
Mitchell	66,680	....	1,200
Zincite	55,820	....	950
Oronogo	48,580	5,340	675
Reeds	38,950	....	625
Totals	6,021,000	862,250	$119,225
28 weeks this year	281,375,550	35,388,190	$5,612,785

Zinc value, the week, $96,575; 28 weeks, $4,633,555
Lead value, the week: $22,650; 28 weeks: $979,230

Here was a net reduction of the output in one week of 3,000 tons. Counting an output of 2,000 tons and a shipment of 3,000 tons, it is not hard to figure that 1,000 tons of the reserve stock was cleaned up. Of the remaining 2,500 tons of reserve, 1,000 tons is owned by one party and is not for sale under an advance of $8 per ton. The balance is sold and much of it would have been delivered during the week had the weather permitted such possibility. The week has produced an overabundance of rain, reaching the stage of waterspouts in several localities of the district, and as a result it is noted that the camps of Badger, Carl Junction, Central City, Cave Springs, Beef Branch and Spurgeon are not listed this week. The curtailment policy and the rainstorms decreased the outputs in all of the camps. It may not be so far-reaching next week, but it is a safe estimate that the output will not exceed 2,500 tons.

The summing up of the situation means that zinc ore is going to be so scarce this summer and fall that it will cost the smelters a purchase price that will compel them to ask for a higher metal price. Spelter must respond by advancing, or the smelter must reduce his production. Any reduction in the manufacture of spelter would create a scarcity of that commodity, as there is less than 5,000 tons of floating metal to-day.

Some of the flooded mines will be able to start up in a couple of weeks and some of them will not restart for months.

Average Prices of Metals per Lb., New York.

Mo.	Tin.		Lead.		Spelter.	
	1903	1904.	1903.	1904.	1903,	1904.
Jan...	28.33	28.845	4.075	4.347	4.865	4.863
Feb ..	29.43	28.087	4.075	4.375	5.043	4.916
Mar..	30.15	28.317	4.442	4.475	5.349	5.057
April.	29.81	28 132	4.567	4.475	5.550	5.219
May .	29.51	27.718	4 325	4.423	5.639	5.031
June .	28.34	26.325	4.210	4.196	5.697	4.760
July..	27.68	.....	4.075	.....	5.662	....
Aug..	28.29	.....	4.075	.....	5.725	....
Sept..	26.77	....	4.243	.....	5.686	....
Oct...	25.92	.....	4.375	.....	5.510	....
Nov..	25.42	.....	4.218	.....	5.338	....
Dec...	27.41	.....	4.162	.....	4.731	....
Year	28.09	.....	4.237	.....	5.400	....

NOTE.—The average price of spelter in St. Louis for the month of January, 1904, was 4.673c. per lb.; February, 4.717c.; March, 4.841c.; April, 5.038c.; May, 4.853c.; June, 4.596c.

Average Prices of Copper.

Mo.	New York.				London.	
	Electrolytic.		Lake.		Standard.	
	1903.	1904.	1903.	1904.	1903.	1904.
Jan...	12.159	12.410	12.361	12.553	53.52	57.55
Feb...	12.778	12.063	12.901	12.245	57.34	56.57
Mar..	14.416	12.299	14.572	12 551	63.85	57.321
April.	14.454	12.923	14.642	13.120	61.72	58.247
May..	14.435	12.458	14.618	13 000	61.73	57.321
June .	13.942	12.269	14.212	12.399	57.30	56.398
July..	13.094	.....	13.341	.....	56.64	.....
Aug..	12.962	.....	13.159	.....	58.44	....
Sept..	13.205	.....	13.345	.....	56.82	.....
Oct...	12.801	.....	12.954	.....	55 60	.....
Nov..	12.617	.....	12.813	.....	56.30	.....
Dec..	11.952	.....	12,084	.....	56.36	.....
Year	13.235	.....	13.417	.....	57.97	.....

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Mo.	1902.		1903.		1904.	
	London. Pence.	N. Y., Cents.	London Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents.
Jan..	25.62	55.56	21.98	47.57	26 423	57.055
Feb..	25.41	55.09	22.11	47.89	26.665	57.592
Mar..	25.00	54.23	22.49	48.72	26.164	56,741
April.	24.34	52.72	23.38	50.56	24 974	54.202
May..	23.71	51.31	24.89	54.11	25.578	55.430
June .	24.17	52.36	24.29	52.86	25.644	55.673
July..	24.38	52.88	24.86	53.92	.....	.....
Aug..	24.23	52.52	25.63	55.36	.....	.....
Sept..	23.88	51.52	26.75	58.00	.....	.....
Oct...	23.40	50.57	27.89	60.36	.....	.....
Nov..	22.70	49.07	27.01	58.11	.....	.....
Dec...	22.21	48.03	25.73	55.375	.....	.....
Year	24.09	52.16	24.75	53.57	.....	.....

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Company	Payable.	Latest Dividend Rate.	Total.	Total to date.
†Am. Sm. & R., com.	July 26	1.25	625,000	1,875,000
†Bon Air C. & I., pf.	July 2	1.50	28,205	221,551
*Bunker Hill & Sull.	July 5	.25	75,000	1,896,000
*Central Eureka, Cal.	July 11	.02	7,968	295,757
*Daly-West, Utah	July 15	.40	72,000	4,175,000
*Dos Estrellas, Mex.	July 15	4.60	13,800	675,975
El Oro, Mex	July 15	.18	194,400	2,708,800
Greene Con., Mex.	Aug. 1	.30	259,200	1,170,220
*Homestake, S. D.	July 25	.25	54,600	12,749,950
Iron Silver, Colo.	Aug. 1	.10	50,000	3,050,000
†Jamison, Cal.	July 18	.03	11,700	156,000
*Lightner, Cal.	July 20	.05	5,113	222,406
*Mines Co. of Am.	July 20	.01¼	25,000	630,000
*Natividad, Mex.	July 15	5.00	12,000	356,463
Ophir, Nev.	July 8	.25	25,200	1,797,400
Osceola, Mich.	July 28	1.00	96,150	4,439,600
*Pac. Coast Borax, Cal.	July 29	1.00	19,000	1,839,500
*Penna. Con., Cal.	July 15	.10	5,150	223,125
†Phil. Nat. Gas, com.	Aug. 1	.75	398,888	4,613,495
*Silver King, Utah	July 10	.66⅔	100,000	8,050,000
Utah Con., Utah	July 15	1.50	450,000	2,586,000

*Monthly. †Quarterly.

ASSESSMENTS.

Company.	Delinquent.	Sale.	Amount.
Allouez, Mich	Sept 20	.....	.50
Am. Quartz, Cal.	June 25	.....	.10
Andes, Nev.	July 11	Aug. 1	.10
Challenge Con., Nev.	July 13	Aug. 3	.10
Chollar, Nev.	July 13	Aug. 3	.10
Comstock, Utah	July 27	Aug. 15	.10
Exchequer, Nev.	Aug. 3	.....	.05
National Con., Cal.	July 23	Aug. 27	.05
Potosi, Nev.	July 20	Aug. 10	.10
Savage, Nev.	July 15	Aug. 5	.10

STOCK QUOTATIONS

NEW YORK.

Company.	Par val.	July 6 H.	July 6 L.	July 7 H.	July 7 L.	July 8 H.	July 8 L.	July 9 H.	July 9 L.	July 11 H.	July 11 L.	July 12 H.	July 12 L.	Sales.
Alice	$25	38											50⅜	200
Amalgamated, c.	100	51⅜	50⅛	51⅜	50¼	51¼	50⅛	51⅛	51	52	51⅛	51⅝		151,585
Anaconda, c.	25	76				74¾	70			74⅜		73		1,070
Belcher, s.	3					20								400
Brunswick	1					8				8				820
Chollers,	2½					19				9				200
Comst. T	2	8						8				9		2,800
Comst. T. Bonds	100	8½												500
Con.Cal.&Va., g.s.	2½									1.10				350
Crown Pt., g. s.	1									11				200
Elkton, g.	1			67		67	66			67				700
Gold Dollar	1					4½		4½						1,500
Gould & Curry, s.	1							21						200
Greene Con.. c.	10	15	14⅜	15⅝	15	15	14⅞	15⅛	15	15¼	15	15⅛	15	7,104
Hale & Norc's,g.s.	3			68		72						74	73	600
Homestake, g.	100													
Iron Silver	1													
Isabella, g.	1	25												1,000
Jack Pot, g.	1							8						500
Justice, s.	21			15		17		19				23	22	800
Little Chief	50					6								300
Mexican, s.	3	1.10		1.00				1.10	1.05	1.05		95		800
Moon Anchor, g.	3											8		500
Moulton	25	17		17										150
Old Gold	1			10										500
Occidental, s.	3					78								100
Ophir, s.	5	3.10						2.74						200
Pharmacist	1													
Phœnix, g.	1	25	23	25	23	25	21	23	22	30	22	29	25	53,000
Portland, g.	1	1.60										1.65		600
Potosi, s.	1			18										200
Quicksilver	100													
Quicksilver, Pf.	100			3.63										100
Savage, s.	3	19						30		27				300
Sierra Nevada s.	3	36	35							35				500
Silver Hill, Pf.	100											60		100
StandardCon.,g.s.	10	2.25		2.33				2.35						371
Syndicate	1									6				500
Tennessee, c.	25					31	28			31	28			
Union Con., g. s.												41	40	300
Union Copper	10	75	68¾	75	68¾	68¾		75		68		1.00	75	
United Copper	100	5⅛		5⅛		5½				5¼		5½		
Utah, s.	1													
White Knob, c.	10	6	5	5¾		5½	5⅝	5¼	5	6	5	5	4½	
Work, g.	1							7						1,000
Yellow Jacket, s.	3					21				21	20			400

c—Copper. g—Gold. l—Lead. s—Silver. Total sales, 229,300 shares

BOSTON, MASS.

Company.	Par val	July 6 H.	July 6 L.	July 7 H.	July 7 L.	July 8 H.	July 8 L.	July 9 H.	July 9 L.	July 11 H.	July 11 L.	July 12 H.	July 12 L.	Sales.
AdventureCon.,c	$25	1⅝										1½		58
Allouez, c.	25	88⅜		88⅝	8¼	88⅜	8½	87¾	88⅛	89	88¾	89	88¾	2,246
†Amalgamated,c.	100	51¼	50⅜	51	50½	o1⅜	50⅜	51⅛	51	52	51⅛	51⅝	50¾	17,533
Am. Zinc	25											10¾	9¼	715
Anaconda, c. s.	25	18½										11	10½	50
Arcadian, c.	25													
Arnold, c.	25													
Atlantic, c.	25	8	7½					7⅞						180
Bingham Con.	50	24	23	24¼	23⅝	24⅝	23⅝	24⅞	24⅛	25	24⅝	25½	24¾	11,019
Calumet & Hecla	25	465	460	463		465	4·3			465		4.65		59
Centennial, c.	25	21¼	20½	21⅛	20⅝	21¼	21	21⅜		21⅜	21⅜	24⅛	23⅛	7,039
†Central Oil	25			9		9⅞				10		9½		609
Con. Mercur, g.	5	27		28		27						25		1,820
Copper Range	100	43⅞	43¼	44	43½	43¾	43½	44⅜	43¾	45	44	50	45	14,786
†Daly West, g.s.l	20	23¾	23½	23½	22¾	23¾		23¼	23	†23		†23	22	1,503
Dominion Coal	100	43⅜	43	43		41½	40½	42		42		42		675
Preferred		104	103	104		104		104		104		104		441
Dominion I. & S.	100													
Elm River, c.	12			2										20
Franklin, c.	25	7⅛				7¼						7½	7¼	345
Granby Con.	10	3				1·3		3·5				3·5	3	2,515
Guanajuato Con.	5			1¼	1¼								1¼	445
Isle Royal Con.	25	8¼	8	8¼	8								8	395
Mass Con., c.	25					4½	4	4					4¼	245
Mayflower, c.	25													
Michigan, c.	25											4¼	4	170
Mohawk, c.	25	41½	41	41½	41¼	41½	41	41¼		41⅜	41¼	43¼	41½	2,656
Mont. Coal & C.	25	4										3½		230
Mont'l & Boston.	5													
New Idria, q.	5													
Old Colony, c.	25											62½		100
Old Dominion, c.	25	12⅛				13							13	662
Osceola, c.	25	62¼	61¾	†61½	61	†61½		†62		†62¾	62	63	62	1,355
Parrot, s. c.	10	26				25		24½		24⅜	24⅛	24⅞	24½	698
Phœnix Con, c.	25												1¼	100
Quincy, c.	25	85						83½	82½	84		87	85	89
Rhode Island, c.	25													
Santa Fe, g. c.	10	1½		1⅝		1½	1⅝							235
Shannon, c.	10	5⅛	5¼	5¾	5⅝	5⅞	5¾					5¾	5⅝	1,820
Tamarack, c.	25			93	91							91		31
Tecumseh, s.	25													
Trinity, c.	25	5	4⅜	4⅞	4⅜	4⅞	4⅜	4⅞		5½	4⅞	5¾	5¼	3,970
United States, g.	10	21¾	21⅜	21⅜	21¼	21¼	21	21⅜	21	21⅜	21⅛	21⅜	20¾	3,879
U. S. Coal & Oil	25			10¼	10⅛							16⅜	10⅛	376
Utah Con., g. c.	5			37½	30¼	37½	36½	†37¼	36¾	†38	37⅛	37¾	37	18,811
Victoria, c.	25			27				23					3	255
Winona, c.	25	7½	7	7¾	7	7¼	7	7¾		7½	7¾	7¾	7¼	3,027
Wolverine, c.	25	73¾		73				74		74	73½	75	74	185
Wyandot, c.	25	70				75				50				120

c—Copper g—Gold. l—Lead. q—Quicksilver. s—Silver. Total sales, 62,698 shares.
†Ex-dividend. §First installment paid.

COAL, IRON AND INDUSTRIAL STOCKS.

ompany.	Par val.	July 6 H.	July 6 L.	July 7 H.	July 7 L.	July 8 H.	July 8 L.	July 9 H.	July 9 L.	July 11 H.	July 11 L.	July 12 H.	July 12 L.	Sale
Allis-Chalmers	$100											43½	42¾	100
Preferred	100							44						
Am. Agr. Chem	100													
Preferred	100													
†Am. Sm. & Ref.	100	54⅜	54⅛	54⅜	54	54⅜	53⅞	54¼		54⅝	54¼	54½	54¼	5,550
Preferred	100	97½	97	97½	97	97½	97	97	96⅞	97		97½	97	4,750
Col. Fuel & I.	100	31⅜	31	31⅜	31½	31		32¼	31⅜	32½		31⅞	31⅜	2,300
Col. F. & Iron, Pf.	100													
Col. & H. C. & I.	100	9¼		9⅛		9⅜	8⅝	9		9½	9⅜	9¾	9¼	800
Crucible Steel	100	4½		4⅛								5⅛	4⅜	1,440
Preferred	100	38⅞	38⅛	38⅛	36¼	36½		36¾		37		37½	37	1,180
General Chem	100			50										
Preferred	100													
Mong. R. Coal	50													
Preferred	50													
National Lead	100	20¾	20	20¾	20	21½	20¾	23¼	21¾	24½	23	24	23	25,405
Preferred	100	93		93				94		95				500
Phila. Nat. Gas	100	39⅛												200
Preferred	100													
Pittsburg Coal	100	14½	14	14½						14½		14½		194
Preferred	100	57½		57¾	57½	58	57½	58¾	58¼	58⅝		58⅛	58	1,568
Republic I. & S.	100	7	6½	6⅞		7		7				7	6¾	1,420
Preferred	100	42½	42	42	41½	41¾	41½	41¾	41½	42		42⅜	42½	4,480
Sloss-Shef S. & I.	100	35½	35	35½	35							36	35½	700
Preferred	100													
†Standard Oil	100	6.27		6.28	6.26							6.30	6.27	55
Tenn. C.I. & R.R.	100	37⅛	36½	38	36¾	37⅝	37	38	37⅜	38¼	37¾	38¾	37¾	7,090
U.S.Steel Corp.	100	11	10⅜	11⅛	10½	11	10⅝	11½	10⅞	11½	10⅞	11⅜	10⅝	73 720
Preferred	100	58½	57	58½	57½	58⅜		58⅝	58⅛	59½	58⅜	60	58⅜	187,115
Va.-Car Chem.	100	24½	23	24½		24½	23½			25	23⅜	24¾		4,455
Preferred	100	96	100¾	100	100¾	100								

*Pittsburg exchanges; all others, New York. Total sales, 323,722.

COLORADO SPRINGS, COLO.

Company.	Par Val	July 2 H.	July 2 L.	July 4* H.	July 4* L.	July 5 H.	July 5 L.	July 6 H.	July 6 L.	July 7 H.	July 7 L.	July 8 H.	July 8 L.	Sales
Acacia	$1	6½	5¾			8¼	5½	6¼	6	6¼	5½	6¾	5¾	1,333
Anaconda	5	16	12			16	12	16	12	16	12	14½	12	
Colo. City & M.	1	2				2	1¾	2¼	1⅞	2	1¾	2	1⅜	
C. K. & N.	1	34½	33			33¾	32¼	34½	33	34	32	35	32	1,000
Cripple Ck. Con.	1	8	7⅝			8	7½	7¾	7½	8	7⅝	7¾	7½	6,000
Des Moines	1													
Doctor-Jack Pot.	1	4½	4⅜			4½	4⅜	4½	4⅜	4½	4⅜	4½	4⅜	1,000
Elkton Con	1	67				69	67½	68½	67½	67½	67	70	66½	500
El Paso	1	86	85½			85⅞	84¾	86	85¾	86	85¾	86	86	25,900
Gold Dollar Con.	1	4¾	4⅝			4¾	4⅝	5	4	5	4¾	4⅞	4¾	4,000
Gold Sovereign	1	6¼	6⅛			6¼	6	6¼	6	6⅜	6¼	6⅜	6¼	7,000
Golden Cycle	1													
Golden Fleece	1													
Hart	1	4	2					4	2	4	2	4	2	
Isabella	1	25½	25			26	25	26	25	25½	25	24¼	24¼	8,700
Jack Pot	1	6				6		6		6				
Keystone	1													
Last Dollar	1	40								40		40		
Lexington	1	3⅜	3¼			3⅜	3	3¼	3⅛	3⅜	3⅛	3¾	3½	
Little Puck	1	3⅞	3¾			3⅞	3⅝	3⅞	3⅝	4	3⅜	3⅞	3⅝	3,000
Mollie Gibson	1	6	5			6	5	6	5	6	5	6	5	
Moon-Anchor	5	8¼	7			8½	7	7½	7	8¼	7	8½	7	
New Haven	1	3½	2¾			3½	2½	3¼		3½	2⅞	3¼	2¾	
Old Gold	1													
Pharmacist	1	3⅜	3			3½	3	3⅜	3	3⅜	3⅛	3⅜	3⅛	6,500
Pinnacle	1	3				3		3		3		3		
Portland	1	1.70	1.58			1.74	1.61½	1.65	1.60	1.65	1.55	1.10	1.58	2,000
Vindicator Con.	1	61				61		61		85	62	85	62	500
Work	1	7	6¼			7	6¼	6⅞	6¼	7	6¼	6¾	6⅝	1,000

*Holiday. Total sales, 67,433 shares.

SAN FRANCISCO.

Company.	Location.	June 30 H.	June 30 L.	July 1 H.	July 1 L.	July 2 H.	July 2 L.	July 4 H.	July 4 L.	July 5 H.	July 5 L.	July 6 H.	July 6 L.	Sales
Golden Anchor	Nev.													
MacNamara	Nev.	70	62									63	60	10,400
Mont. Tonopah	Nev.	2.45	2.42½									2.47½	2.45	5,120
Ton. Belmont	Nev.	78										89	79	4,300
Ton. & Calif'nia	Nev.													
Ton. Midway	Cal.	62	59									60		4,250
Ton. Mg. Co.	Nev.											8.25		300
Ton. North Star	Nev.	35										34		800
Ton. & Salt Lake	Nev.													

Total sales, 25,170 shares.

SAN FRANCISCO (By Telegraph).

Company.	July 11.	July 12.
Belcher	18	17
Best & Belcher	1.15	115
Caledonia	59	57
Challenge Con	21	20
Chollar	9	10
Confidence	80	80
Con. California & Virginia	1.15	1.15
Crown Point	12	13

Name of Company.	July 11.	July 12.
Gould & Curry	19	15
Hale & Norcross	72	72
Mexican	1.00	1.00
Ophir	2.65	2.55
Overman	21	20
Sierra Nevada	34	33
Union Con	44	33
Yellow Jacket	14	20

COLORADO SPRINGS (By Telegraph).

Company.	July 11 H.	July 11 L.	July 12 H.	July 12 L.
Anaconda	14	12		
Cripple Ck Con.	7¾	7⅜	7¾	7⅜
C. K. & N.	34	32	33½	32⅝
Doctor-Jack Pot.	4½	4⅜		
Elkton Con	70	66½	67¼	66¾
El Paso	87½	87	90	88
Gold Dollar Con.			4⅞	4¾
Gold Sovereign	6⅜	6¼	6¾	6⅝
Isabella	24	22¼	23	22

Company.	July 11 H.	July 11 L.	July 12 H.	July 12 L.
Jack Pot	6			
Last Dollar	40			
Mollie Gibson	5½	4¾	5½	4¾
Moon Anchor	8¾		8	
Old Gold	9¼	9	9¼	9
Pharmacist	3½	3¼		
Portland	1.60	1.50	1.54	1.50
Vindicator	85	65		
Work	6⅜	6⅛	6¾	6⅛

PHILADELPHIA, PA

Company	Par val.	July 6 H.	July 6 L.	July 7 H.	July 7 L.	July 8 H.	July 8 L.	July 9 H.	July 9 L.	July 11 H.	July 11 L.	July 12 H.	July 12 L.	Sales
Am. Cement	10	8⅛	8	8⅛								8		290
Cambria Iron	50	45¾								46				75
Cambria Steel	50	20⅛	19⅞	20¼	20	20¼	20⅛	20¼	20	20¼		20⅜	20	3,744
Int. Smokel's Pd.	100	15¼				15¼				15¼		15¼		415
Int Sm. Pd. Pfd.	100													655
Lehigh C. & N.	50	81½	80	81½		80½								
Mont. Tonopah	1					2.50								
Philadelphia	50	39⅜	39½	39⅝	39	39¼	39¼	39¼				39¼	39	2,168
Phila. Pfd.	50	45		45		45				45		45¾		402
Tonopah	100	8.25		8.25		8.25	8.12	8.12		8.12	8.00			
Tonopah, Belm.	1			86	80			86	85					
United Gas & C'l.	50	85	84	84¾	84	84½	84¼	85	84⅞	85¼	85	85¾	84¾	4,786
Westmoreland C.	50													

Total sales 12,535.

STOCK QUOTATIONS

ST. LOUIS, MO.* July 9.

Name.	Par Val.	Prices. Bid.	Ask.	Name.	Par Val.	Prices. Bid.	Ask.
Am.-Nettie, Colo....	$10	$0.25	$0.25	Columbia Lead, Mo.	$10	$2.00	$2.50
Catherine Lead, Mo.	10	1.00	1.50	Con. Coal, Ill.....	100	16.00	18.00
Central Coal & C....	100	58.50	60.50	Doe Run Lead Mo.	100	110.00	115.00
Central C. & C., pf..	100	71.00	71.50	Granite Bimet. Mt..	10	.45	.50
Central Lead, Mo...	100	110.00	115.00	St. Joe Lead, Mo,...	10	14.50	16.00

*By our Special Correspondent.

SALT LAKE CITY.* July 9.

Company	Par Val	High	Low	Sales.	Name of Company	Par Val	High	Low	Sales.
Butler Liberal.	1	11	10⅜	2,600	May Day.....	¼	1⅜	1⅛	6,500
Carisa.....	1	6½	6¼	1,000	N. Y. Bonanza	1	2½	2	6,500
Century	1	61	55	700	Naildriver.....	5	26½	25	300
Con. Mercur...	5	26	23	8,400	Silver Shield ..	20	5½	5	1,500
Daly.....	...	2.50	2.50	50	Silver King.....	...	51	50.50	125
Daly West.....	1	23.60	23.00	125	Star Con.....	1	13	11¾	5,500
Daly Judge	20	4.30	4.30	125	Swansea.....	...	43	43	400
Galena.....	...	5⅜	.05¼	5,000	Tetro.....	1	34	33⅜	1,000
Grand Central.	1	4.10	4.10	100	Tonopah Belm.	...	...	...	...
La Reine.....	1	6	5⅞	800	Uncle Sam, Con	1	16¾	18¼	2,000
L. Mammoth.....	...	17⅜	.17	2,600	Yankee Con ...	1	33½	33½	500
Little Chief....	1	...	...	...	Wabash.....	...	2¼	2	2,000
Mammoth.....	...	1.22	1.20	600	.....	...	...	...	...

*By our Special Correspondent. All mines are in Utah. Total sales, 48.425 shares.

DULUTH, MINN. May 28.

Company	Par Val.	Bid.	Asked.	Company	Par Val.	Bid.	Asked.
Calumet & Arizona.....	$10	$100	$105	Lake Sup. & Pitts Dev..	$10	$145	$150
Calumet & Bisbee.....	10	3.00	4.50	Pitts. & Duluth Dev....	15	33.50	36.00
Calumet & Cochise.....	10	5.00	5.50	Shakespeare.....	10	.....	.20
Calumet & Pittsburg..	10	25.00	28.00	United Mexican	10	.....	.50
Higgins Development..	10	2.00	2.50	Wolverine & Arizona...	10	3.50	.....
Junction Development	15	18.00	21.00	Yaqui.....	10	.....	1.00

MONTREAL.* July 7.

Company	Par val.	Quotations High	Low	Sales	Company	Par val	Quotations High	Low	Sales
Dominion Coal.	100	44.00	41.00	675	Montreal Steel..	100	35.00	.....	...
Dom. Coal, Pf...	100	108.00	104½	320	Mont'l Steel, pf.	100	100.00	75.00	.....
Dom. I. & St....	100	7.75	.....	215	Nova Scotia St..	100	71.00	65.00	1,572
Dom. I. & St..Pf.	100	24.00	22.00	7,242	N. S. Steel, Pf.,.	100	115.00	110.00	.....
Internat'l Coal..	100	100.00	.....	.....	Ogilvie.....	100	200.00	179.00	.....
Int'l Coal, Pf....	100	100.00	.....	.....	Ogilvie, Pf.....	100	119.00	119.00	235

*Montreal Stock Exchange. Total sales, 10,259 shares.

MEXICO. June 20.

Company.	Shares Issued	Prices, Mex. Bid.	Ask.	Company.	Shares Issued.	Prices, Mex. Bid.	Ask.
Durango:				Trompillo.....	1,200	$1,925	$1,940
Ca. Min. de Penoles..	2,500	$2,700	$3,000	San Rafael y An., aviada.....	1,200	740	750
San Andres de la Sierra	200	10,000	.....	Soledad, aviada.....	670	800	825
Guanajuato:				Sorpresa, aviada.....	960	300	310
Angustias, Pozos....	2,400	41	44	**Mexico:**			
Cinco Senores y An., aviadoras.....	2,000	35	45	Alacran.....	2,400	20	28
Cinco Senores y An., aviada	400	35	45	Aldebarren.....	2,000	44	46
Providencia, San Juan de la Luz.....	6,000	60	65	Buen Despacho.....	3,000	60	65
Queensland y Australia.....	300	10	20	Dos Estrellas.....	3,000	2,080	2,100
Guerrero:				La Esperanza (El Oro.).....	3,000	1,500	1,500
Delfina, 1st serie.....	2,500	30	40	La Reformia, aviadores.....	2,000	35	38
Delfina, 2nd serie....	2,500	25	30	Santa Ana, Esperanza.....	2,400	.....	90
Garduno y Anexas..	7,200	35	40	**Michoacan:**			
Hidalgo:				Luz de Borda, aviadora.....	3,000	30	32
Amistad y Concordia	9,600	80½	81	Luz de Borda, aviado.....	1,000	10	17
Carmen, aviada.....	1,100	85	95	Santiago y An., Tlal..	4,000	8	10
Guadalupe Fresnillo Mill	1,000	170	200	**Nuevo Leon:**			
Guadalupe Fresnillo Mine.....	1,400	70	80	La Fraternal.....	1,000	580	630
La Reina y An., aviadora.....	5,600	2	4	Norias de Bajan.....	1,000	880	920
Luz de Maravillas, aviadas.....	1,100	.....	20	**San Luis Potosi:**			
Maravillas y An., aviador.....	1,680	110	150	Concepcion y An.....	3,000	50	60
Maravillas el Lobo ..	1,000	130	180	El Barreno, aviadora.	2,000	65	68
Palma y An., aviador.....	1,800	4	8	Sta. Maria de la Paz..	9,800	174	178
Refugio, aviada.....	12,800	680	740	San Diegoy Annexas.	2,400	8	10
Santa Anay An., aviadora.....	200	50	70	**Zacatecas:**			
Santa Anay An., aviada.....	600	25	35	Asturiana y An.....	2,500	45	50
Sta. Gertrudis y An., aviadas.....	9,800	13½	15	Candelaria y Pinos..	2,500	10	20
Sta. Gertrudis y An., aviadora.....	28,800	80	81	Esperanza y An.....	2,400	6	8
Santo Tomas Apostol aviadoras.....	5,100	2	3	Refugio, aviada.....	2,500	21	25
San Felipe de Jesus, aviadora.....	3,000	15½	17	Luz de Mimillas, pagadoras.....	2,000	.....	.....
San Felipe de Jesus, aviada.....	1,200	3	6	Nueva Quebradilla, aviadoras.....	2,400	25	40
San Rafael y An.,				Nueva Quebradilla, aviadas.....	600	22	35
				San Carlos y Annexas	2,500	55	60
				Sta. Maria de Gaud..	2,500	80	85
				Miscellaneous:			
				Bartolome de Medina	2,000	98	100
				Naica (Chihuahua.)..	100	11,000	13,000
				Natividad (Oaxaca) aviadora.....	1,800	950	1,000
				San Francisco Hac...	6,000	85	90
				Union Hacienda.....	3,000	290	310

LONDON. July 1.

Company.	Shares Issued.	Par value.	Latest dividend. Amt.	Date.	Quotations. Buyers.	Sellers.
		£. s. d.	s. d.		£ s. d.	£ s. d.
American:						
Alaska-Treadwell	200,000	5 0 0	1 6	Apr., 1904	4 7 6	4 12 6
Anaconda.....	1,200,000	5 0 0	2 0	May, 1904	3 11 3	3 13 9
Camp Bird.....	820,000	1 0 0	1 0	June, 1904	1 5 0	1 7 6
Copiapo.....	112,500	2 0 0	6 10	May, 1903	17 6	1 2 6
*De Lamar	80,000	1 0 0	1 6	May, 1904	12 6	15 0
El Oro.....	1,080,000	1 0 0	9	July, 1904	1 2 6	1 5 0
Esperanza.....	455,000	1 0 0	1 0	June, 1904	...	...
Frontino & Bolivia....	128,662	1 0 0	3 0	July, 1901	6 3	8 9
Le Roi.....	200,000	5 0 0	5 0	Nov., 1899	16 3	1 8 9
Le Roi No. 2.....	120,000	5 0 0	1 0	June, 1904	13 9	16 3
Palmarejo & Mexican...	445,000	1 0 0	rts.	April, 1903	7 0	8 0
Standard.	500,000	4 0	2½	Sept., 1903	2 6	3 6
Stratton Independence.	1,000,007	1 0 0	6	Dec., 1903	2 3	2 9
St. John del Rey.....	546,265	1 0 0	6	Dec., 1903	11 6	12 6
Tomboy.....	300,000	1 0 0	1 0	June, 1902	1 5 0	1 10 0
Ymir.....	200,000	1 0 0	1 0	Mar., 1902	2 6	5 0
European:						
Linares.....	15,000	3 0 0	5 0	Apr., 1904	3 5 0	3 15 0
Mason & Barry	185,172	1 0 0	7 0	May, 1904	2 17 6	3 2 6
Rio Tinto	325,000	5 0 0	37 6	May, 1904	52 2 6	52 7 6
Rio Tinto, preferred ...	325,000	5 0 0	2 6	May, 1904	6 0 0	6 5 0
Tharsis.....	625,000	2 0 0	7 0	May, 1904	4 5 0	4 10 0
West Australian:						
Associated	495,388	1 0 0	2 6	July, 1904	2 11 3	2 13 9
Cosmopolitan.....	400,000	1 0 0	1 0	Apr., 1904	10 0	11 0
Golden Horseshoe.....	300,000	5 0 0	6 0	Apr., 1904	7 6 3	7 8 9
*Great Boulder.....	1,750,000	2 0	1 0	June, 1904	1 5 6	1 6 0
Gt BoulderPersever'ce	1,400,007	1 0 0	1 3	May, 1904	11 3	11 9
Great Fingall.....	250,000	1 0 0	7 0	July, 1904	8 0 0	8 10 0
Ivanhoe.....	200,000	5 0 0	7 6	Apr., 1904	7 13 9	7 16 3
Kalgurli	120,000	1 0 0	2 6	July, 1904	5 7 6	5 10 0
Lake View	250,000	1 0 0	rts.	Aug., 1902	1 5 0	1 7 6
*Oroya-Brownhill	450,000	1 0 0	3 0	June, 1904	3 5 0	3 7 6
Miscellaneous:						
Brilliant Central	100,000	1 0 0	1 0	July, 1904	3 0 0	3 5 0
Briseis	600,000	1 0 0	...	.....	7 9	8 3
Broken Hill.....	980,000	8 0	1 0	May, 1904	1 16 6	1 17 6
*Mt. Lyell.....	275,000	3 0 0	1 3	June, 1904	12 6	13 6
Mt. Morgan.....	1,000,000	1 0 0	3	May, 1904	2 6 3	2 8 9
Waihi.....	497,412	1 0 0	4 6	June, 1904	5 8 9	5 11 3
Indian:						
Champion Reef..... .	513,832	10 0	1 3	May, 1904	1 11 1	1 12 3
Mysore.....	566,043	10 0	4 6	July, 1904	6 11 3	6 13 9
Nundydroog.....	484,000	10 0	1 3	July, 1904	1 15 0	1 16 3
Ooregum.....	343,000	10 0	1 3	Apr., 1904	1 0 0	1 1 3
Ooregum, pfd.....	240,000	10 0	1 3	Apr., 1904	1 8 9	1 11 3
South African:						
Angelo.....	600,000	1 0 0	7 0	July, 1904	1 3	7 3 9
Bonanza.....	200,000	1 0 0	8 0	Aug., 1904	1 6 3	1 8 9
British South Africa....	4,436,019	1 0 0	rts.	May, 1899	1 11 1	1 12 3
Cape Copper.....	300,000	2 0 0	2 6	July, 1904	3 2 6	3 7 6
Cape Copper, pfd.....	75,000	2 0 0	2 6	July, 1904	3 5 0	3 10 0
City & Suburban	340,000	4 0 0	4 0	Aug., 1904	6 7 6	6 10 0
Consol. Gold Fields.....	2,000,000	1 0 0	...	.....	6 12 6	6 17 6
Crown Reef.....	120,000	1 0 0	6 0	June, 1904	14 7 6	14 12 6
De Beers, preferred....	800,000	2 10 0	10 0	July, 1904	18 10 0	18 12 6
De Beers, deferred.....	1,000,000	2 10 0	12 6	July, 1904	19 2 6	19 5 0
East Rand.....	990,000	1 0 0	5 0	July, 1903	7 16 0	7 15 0
Ferreira.....	90,000	1 0 0	22 6	Aug., 1904	20 15 0	21 5 0
Geldenhuis	200,000	1 0 0	7 0	Aug., 1904	5 10 0	5 12 6
Geduld.....	400,000	1 0 0	rts.	Mar., 1902	6 7 6	6 8 9
Henry Nourse.....	125,000	1 0 0	8 0	Aug., 1904	8 7 6	8 12 6
Jubilee.....	50,000	1 0 0	5 0	Aug., 1904	4 12 6	4 17 6
Jumpers.....	100,000	1 0 0	2 6	May, 1904	2 17 6	3 2 6
Langlaagte.....	470,000	1 0 0	2 0	Aug., 1904	3 13 9	3 16 3
May.....	288,750	1 0 0	3 0	Aug., 1904	3 17 6	4 0 0
Meyer & Charlton.....	100,000	1 0 0	5 0	Aug., 1904	5 7 6	5 12 6
Modderfontein	200,000	1 0 0	rts.	Apr., 1902	8 13 9	8 16 3
Namaqua.....	94,331	2 0 0	3 0	Dec., 1903	2 15 0	3 0 0
*New Jagersfontein.	200,000	5 0 0	10 0	June, 1904	27 5 0	27 15 0
New Primrose.....	225,000	1 0 0	3 0	Aug., 1904	3 12 6	3 15 0
Rand.....	1,765,366	5 0	5 0	Aug., 1902	10 6 3	10 7 6
Robinson	750,000	5 0 0	6 0	Aug., 1904	9 7 6	9 12 6
Robinson Deep.....	950,000	1 0 0	3 0	Aug., 1904	5 10 0	5 12 6
Rose Deep	425,000	1 0 0	3 0	Aug., 1904	8 15 0	9 0 0
Salisbury	400,000	1 0 0	2 0	June, 1904	1 16 3	1 18 9
Village.....	400,000	1 0 0	4 0	July, 1904	6 12 6	6 17 6
Wemmer.....	80,000	1 0 0	12 6	July, 1904	11 5 0	11 15 0

*Ex-dividend.

LONDON (By Cable.)*

Company.	July 6 £.	s.	d.	July 13 £.	s.	d.	Company.	July 6 £.	s.	d.	July 13 £.	s.	d.
Anaconda.....	3	15	0	3	15	6	Esperanza.	‡1	0	6	1	0	0
Camp Bird.....	1	7	3	1	7	9	Modderfontein....	8	13	9	8	8	9
Con. Gold Fields.	6	7	6	6	0	0	Rand Mines.....	10	6	3	10	2	6
De Beers.....	18	2	6	18	7	6	Rio Tinto	53	5	0	53	2	6
East Rand.....	7	13	1½	7	10	0	Simmer & Jack...	1	12	6	1	11	3
El Oro.....	1	3	9	1	3	9	Tomboy.....	1	3	9	1	3	9

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.
‡Cumulative dividend.

PARIS. June 23.

Company.	Location.	Capital Stock.	Par value.	Latest divs.	Prices. Opening.	Closing.
		Francs.	Fr.	Fr.	Fr.	Fr.
Anzin, Coal.....	France	.....	.....	290.00	5,524.00	5,505.00
Boleo, c.....	Lower Cal....	12,000,000	500	104.17	1,872.00	1,825.00
Champ d'Or, g.....	S. Africa.....	3,375 000	25	3.75	18.75	18.75
Courrieres, Coal.....	France	600,000	500	110.00	2,880.00	2,940.00
Fraser River, g.....	Brit. Col.....	250,000	25	.....	5.50	5.50
Huanchaca, s.....	Bolivia.....	40,000,000	125	2.50	88.75	88.25
Laurium, z. l.....	Greece.....	16,300,000	500	25.00	318.00	310.00
Malfidano, z.....	Italy	12,500,000	500	50.00	590.00	590.00
Metaux, Cie. Fran. de.....	France	25,000,000	500	22.50	489.00	475.00
Mokta-el-Hadid, i. l.....	Algeria	18,312,000	500	40.00	868.00	915.00
Nickel, n.....	N. Caledonia..	15,000,000	250	22.50	590.50	557.00
Penarroya, Coal	Spain.....	.....	500	45.00	1,052.00	1,070.00
Vielle Montagne z.....	Belgium.....	9,000,000	30	30.00	680.00	684.00
.....	.....	.....	.....	.....	.....	.....

c—Copper. g—Gold. i—Iron. l—Lead. n—Nickel. o—Oil. s—Silver. z—Zinc.